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SMILODON

Ferocious *Smilodon* was a deadly hunter with stabbing fangs.

Even creatures the size of an elephant were not safe from *Smilodon*'s deadly attack. Perched on the branch of a tree, it would lie in wait for a slow-moving victim to pass by. With an upward bound, *Smilodon* leapt into the air then plunged downwards, its jaws gaping wide. It stabbed the flesh of its prey over and over again with its two sabre sword-like teeth.

BY THE THROAT

Smilodon knew its victim's weakest points. It attacked the throat of thick-skinned animals by taking a fold of skin and biting out a chunk of flesh. As the arteries of the neck were pierced, the animal bled faster and became too weak to fight. Then the predator began its meal.

WEAK TEETH

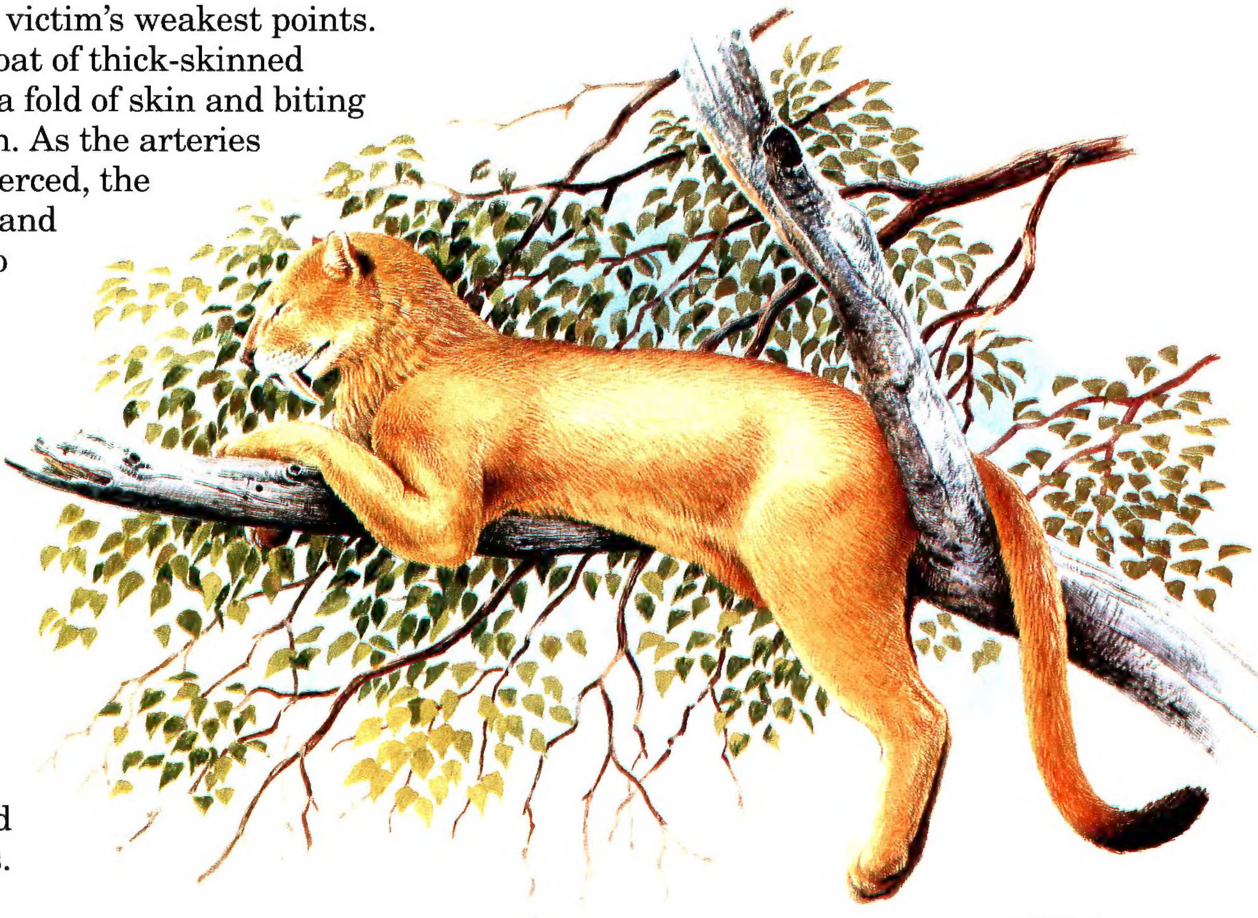
Smilodon's long teeth were too weak to deal with struggling prey. Experts have discovered that its longest teeth may have been deadly, but they did not have firm roots.

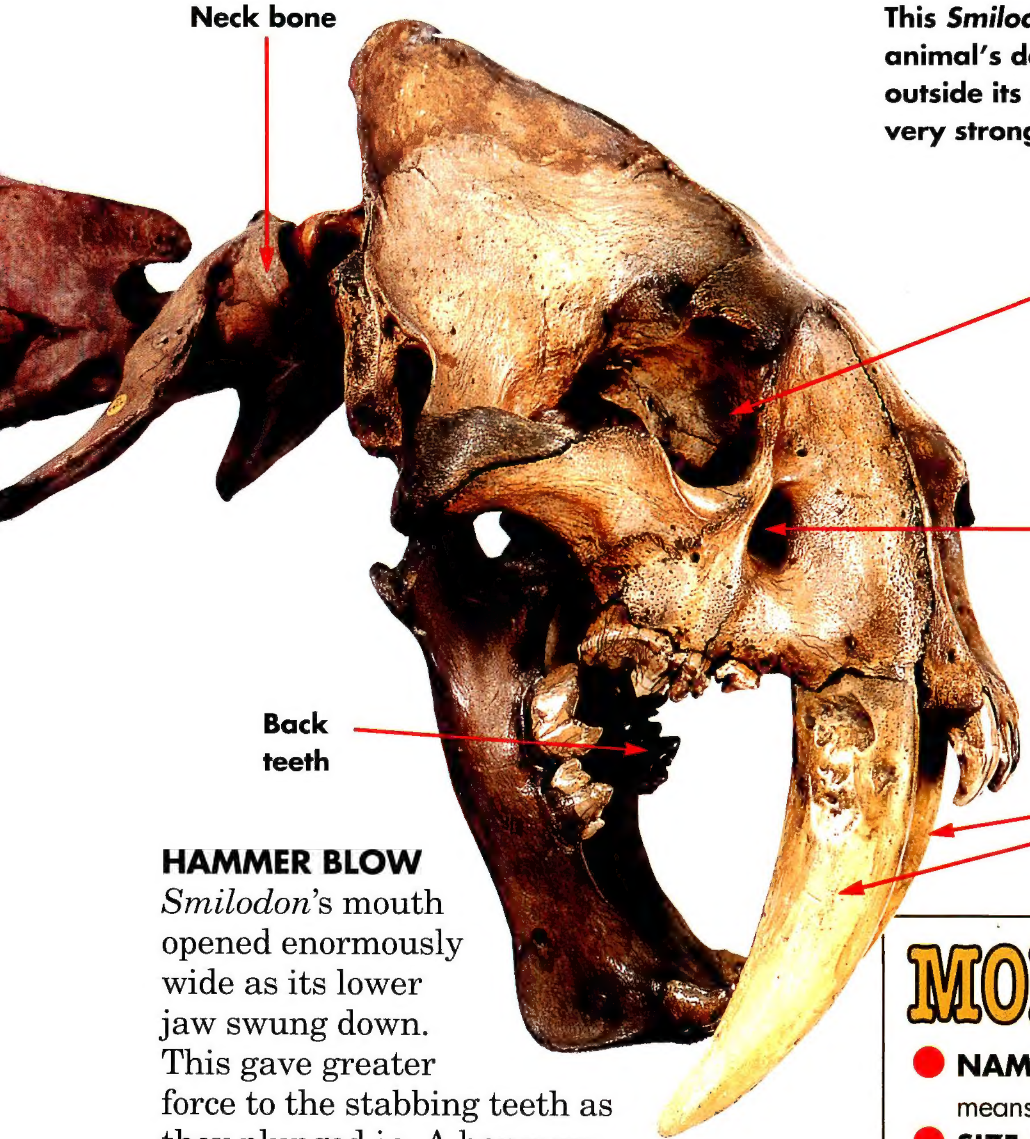
BLOODY STRUGGLE

If a creature put up a fight, *Smilodon*'s fangs could be broken by the writhing victim. So *Smilodon* only used these teeth as stabbing tools and waited patiently for its victim to die from loss of blood.

WHAT BIG TEETH HE'S GOT!

Imagine *Smilodon*'s monstrous fangs hanging over the top of this page. They would come more than half way down! These teeth were always on display, even when *Smilodon*'s mouth was closed. They were supported and protected by the lower jaw, which stopped them from snapping when they pierced an animal's skin.





This *Smilodon* skull shows how the animal's deadly fangs hung down outside its mouth. These teeth were not very strong but they were lethal.

HAMMER BLOW

Smilodon's mouth opened enormously wide as its lower jaw swung down. This gave greater force to the stabbing teeth as they plunged in. A hammer-like blow was needed to drive their blunt ends through thick skin, so huge muscles at the back of *Smilodon*'s neck added extra force to its killer bite.

ON GUARD!

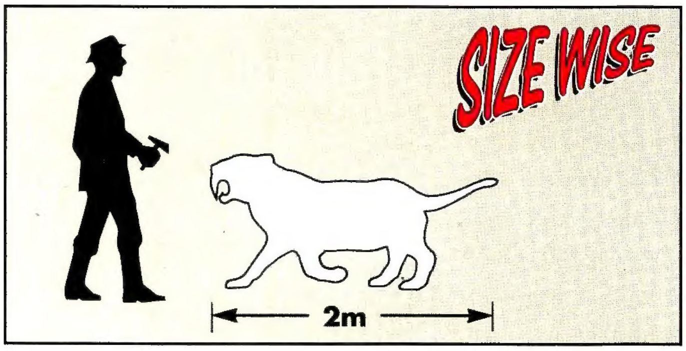
Experts think that *Smilodon* was probably a scavenger as well as a hunter. It guarded its kill jealously and attacked creatures like wolves who tried to steal its prey.

TAR TRAP

Over 10,000 years ago in Rancho La Brea, California, rain fell on pits of deep tar and created large puddles. Unwary beasts waded in to take a drink and were trapped.

MONSTER FACTS

- **NAME:** *Smilodon* (smile-oh-don) means 'chisel tooth'
- **SIZE:** up to 2m long
- **GROUP:** mammal
- **FOOD:** meat and the flesh of dead animals
- **LIVED:** between 2 million and 10,000 years ago in the Pleistocene Epoch in South America



Is it true that there are no sabre-toothed cats alive today?

Sadly, there are not. Our earliest ancestors probably saw sabre-toothed cats. They probably even fought with these vicious animals in terrifying fights! The last of the sabre-toothed cats died out 10,000 years ago. By then all the big Ice-Age mammals – such as the woolly rhinoceroses, the mammoths and the mastodons – were dying out. The sabre-tooths had evolved to feed on these mammals and when this food supply had gone, the cats perished too.

THE BITER BIT

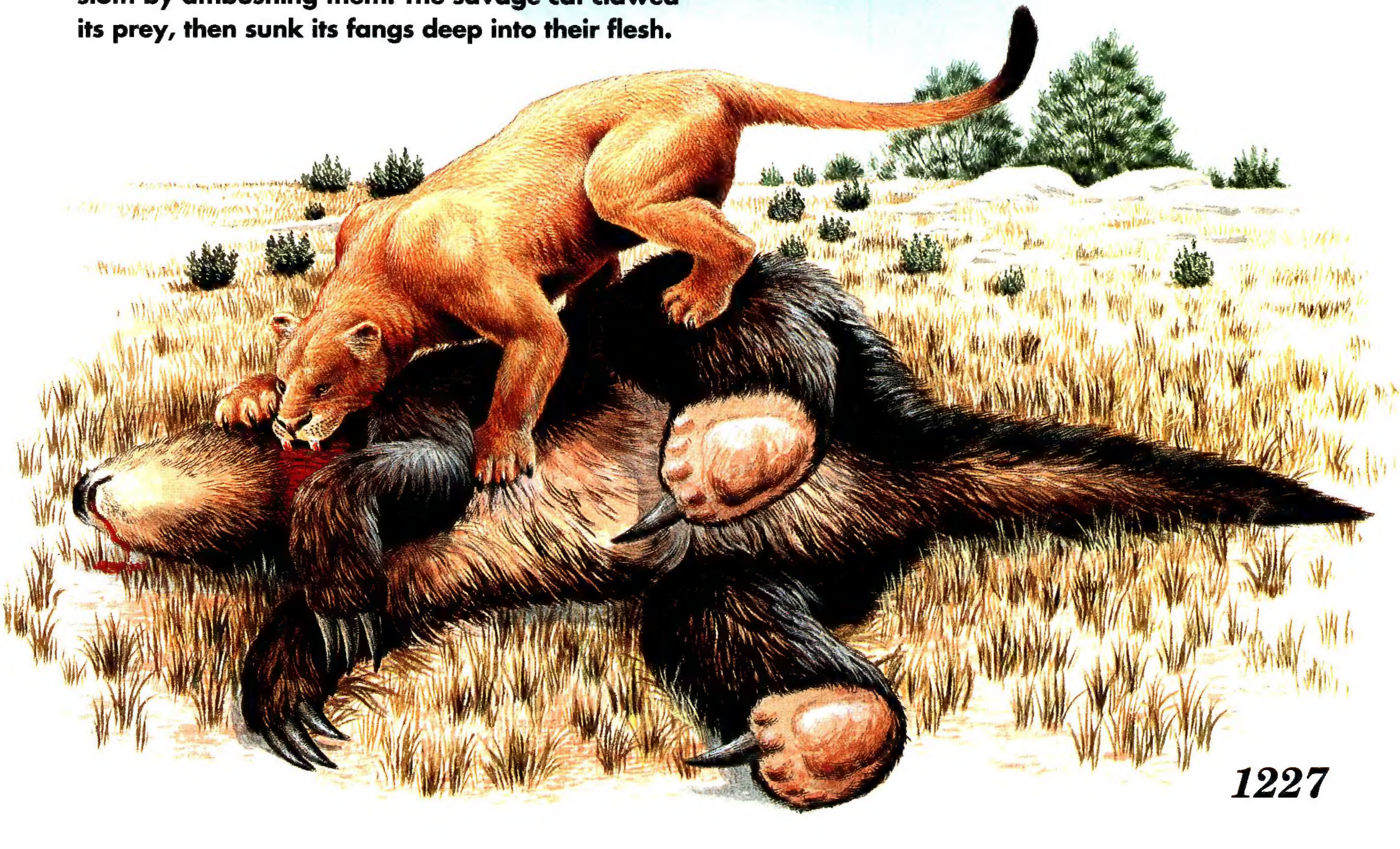
As the animals – including bison, horses and elephants – lay helpless in the clinging tar, *Smilodon* saw them as easy targets. But as *Smilodon* picked out its victim and attacked, it was also trapped and sucked down into the pit.

CREATURES GREAT AND SMALL

La Brea tar pits tell us a lot about many prehistoric creatures. The fact that masses of *Smilodon* fossils were found with fossils of wolves, for instance, is evidence that the wolves were likely victims of *Smilodon*.

Just as soldiers (below) wielded sabre swords in battle, so *Smilodon* used its sabre-teeth to attack its prey.

***Smilodon* attacked animals like this giant ground sloth by ambushing them. The savage cat clawed its prey, then sunk its fangs deep into their flesh.**



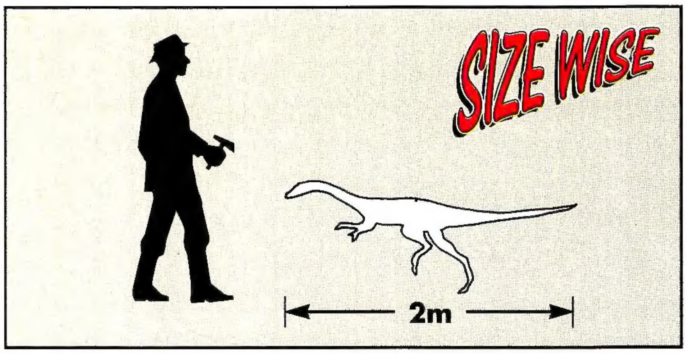
ELMISAURUS

Agile *Elmisaurus* was a speedy predator with bird-like feet.

Very little is known about this lightweight dinosaur as only parts of its hands, feet and legs have been found. Because there is no skull, experts can only guess what *Elmisaurus* looked like. It was probably a predator and fed on small mammals and insects. It used its two nimble legs to pursue speedy prey.

SLENDER FINGERS

Elmisaurus had three long, slender fingers, with a large, sharp claw at the end of its middle finger. Some experts think it used this claw to get at small creatures in cracks and crevices in the rocks. Like *Dromiceiomimus*, *Elmisaurus* used its flexible hands to grip small, wriggling prey.

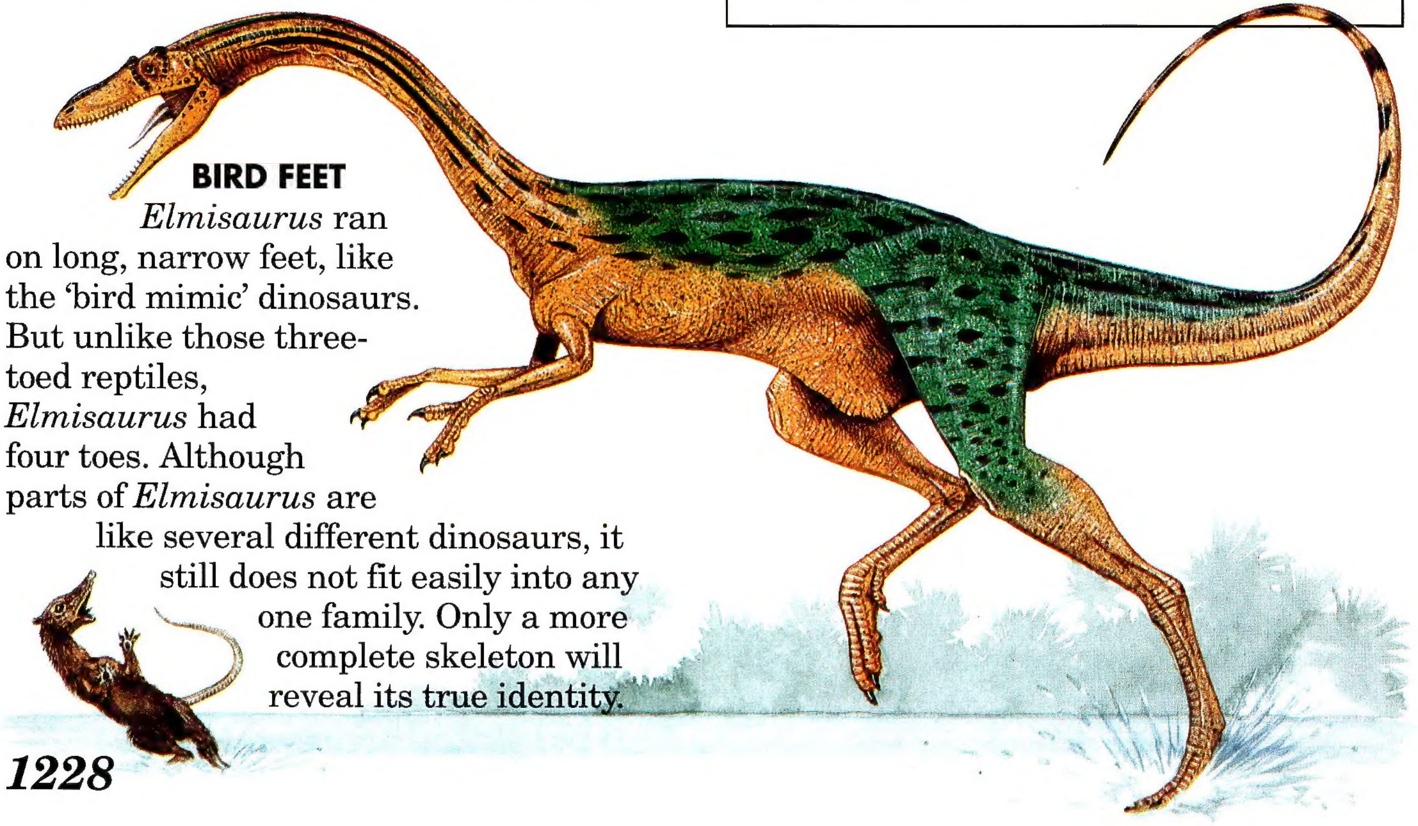


MONSTER FACTS

- **NAME:** *Elmisaurus* (el-mi-saw-rus) means 'foot reptile'
- **SIZE:** about 2m long
- **GROUP:** dinosaur
- **FOOD:** probably small mammals and insects
- **LIVED:** about 80 million years ago in the Late Cretaceous Period in Mongolia and Alberta, Canada

BIRD FEET

Elmisaurus ran on long, narrow feet, like the 'bird mimic' dinosaurs. But unlike those three-toed reptiles, *Elmisaurus* had four toes. Although parts of *Elmisaurus* are like several different dinosaurs, it still does not fit easily into any one family. Only a more complete skeleton will reveal its true identity.



AMMONITE

Some of the most beautiful and plentiful of all fossil remains belong to the ammonite group.

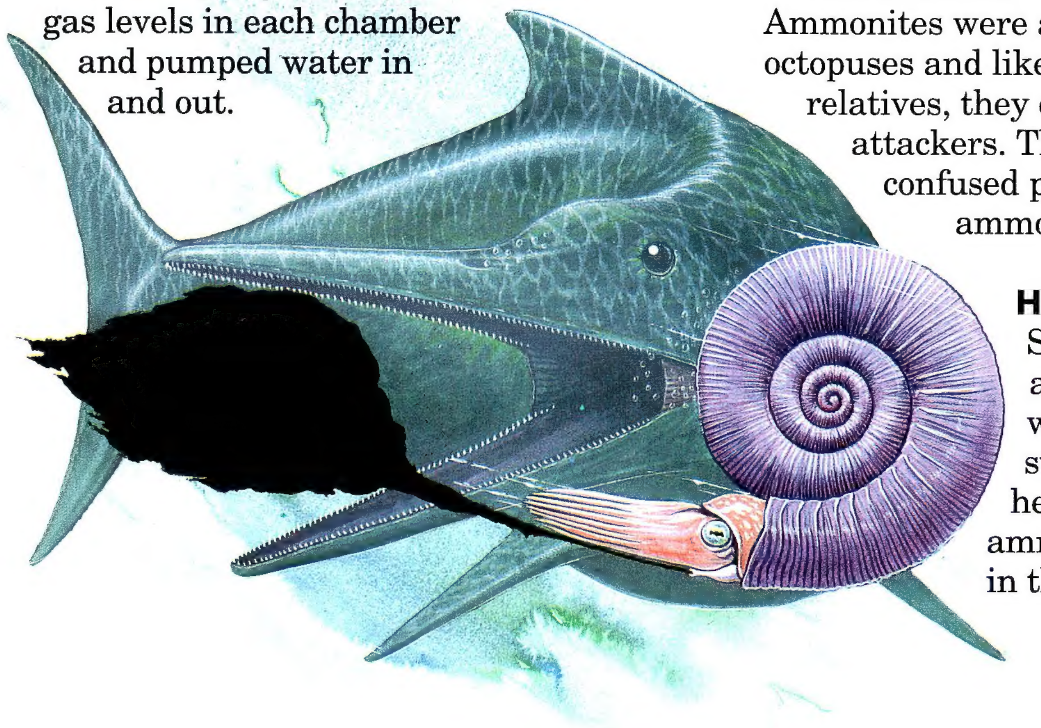
Ammonites lived in the world's oceans for more than 160 million years and became extinct at the same time as the dinosaurs. In shallow seas, they were the prey of reptiles like plesiosaurs.

FILLED WITH GAS

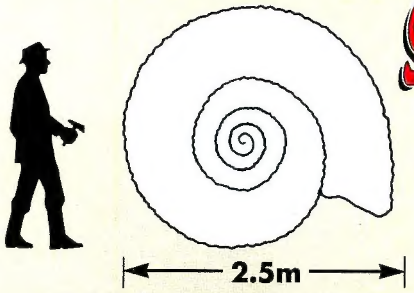
Ammonites' shells were coiled in various shapes and sizes. Some were as small as your thumbnail and others were as wide as a bus! The shell was divided into gas-filled chambers which acted like flotation tanks and stopped the ammonites sinking.

PUMP IT UP!

To move up and down, the ammonites adjusted the gas levels in each chamber and pumped water in and out.



SIZE WISE



MONSTER FACTS

- **NAME:** Ammonite (am-on-ite) means 'horn of Ammon' after a ram-headed Egyptian god
- **SIZE:** 2cm – 2.5m
- **GROUP:** mollusc
- **FOOD:** tiny organisms and small sea creatures
- **LIVED:** between 225 to 64 million years ago from the Early Triassic to the Late Cretaceous Period in seas all over the world

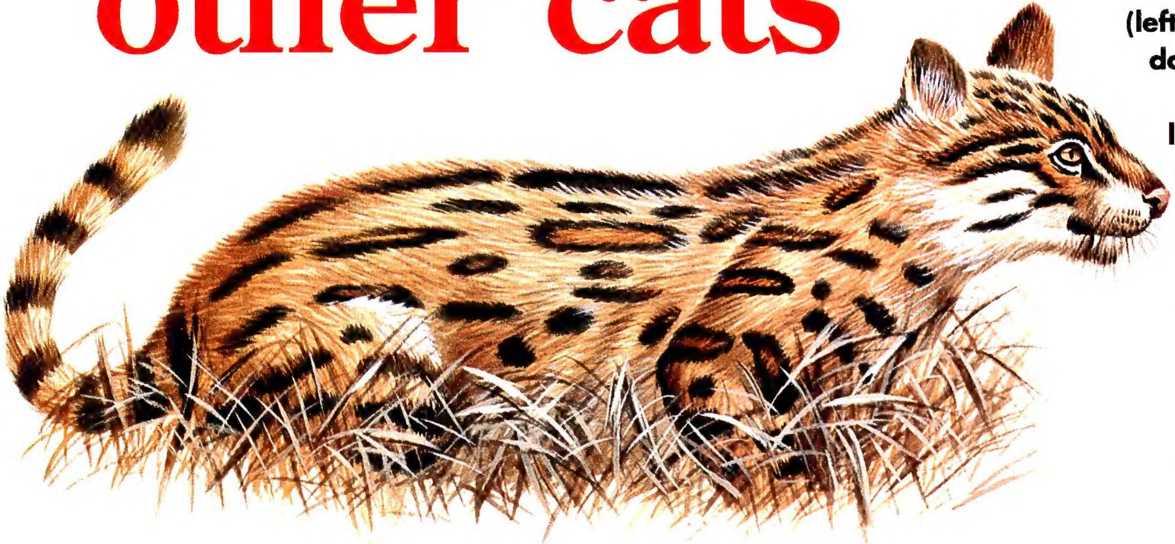
INK SQUIRTERS

Ammonites were ancestors of today's octopuses and like their modern day relatives, they could squirt ink at their attackers. The dark cloud of ink confused predators and gave the ammonite time to escape.

HIDE AND SEEK

Some ammonites had ribs and spines on their shells which gave them added strength. They also helped camouflage the ammonites when they hid in the rocks on the sea bed.

Sabre-tooths and other cats



We know the shape of *Dinictis* (left) from its skeleton. We do not know how it was coloured. It may have looked like the modern ocelot, pictured below.

Stabbing or biting? Discover how prehistoric cats killed their prey.

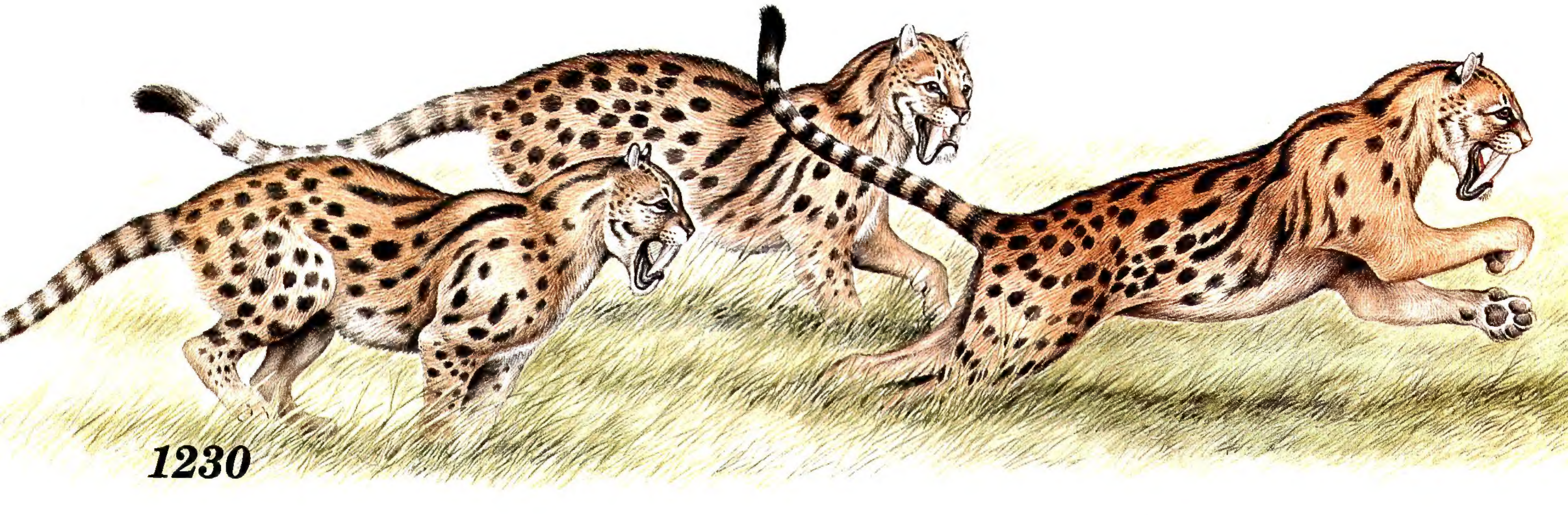
The important hunting mammals today are the dogs, such as foxes and jackals, and the cats, such as lions and lynxes. They are easy to tell apart. A dog running along the street goes clickety-clickety as its claws hit the ground. Now listen to a cat. You cannot hear it. This is an important difference.

CHASING OR AMBUSHING?

Dogs hunt by running, and chasing their prey. Cats hunt by sneaking up on it quietly and ambushing it.

SOFTLY, SOFTLY

Cats are silent because their claws are 'retractable' – they can pull them up off the ground and creep along silently. They only bring out their claws for fighting and killing. Dogs can't do that. They use their claws for running on.



TELLING CLUES

If we find the fossil of a carnivorous mammal that could be a cat or a dog, the bones of the toes tell us which it is. Other clues include the cat's short skull and big meat-shearing cheek teeth. We need these clues, because some of the earliest cats did not look like cats today.

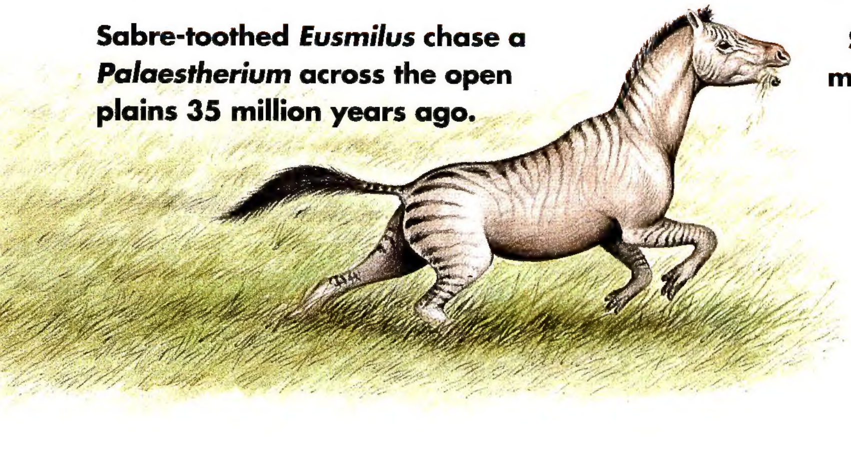
CATS' CRADLE

One of the first cats was *Dinictis*. It was about the size of a domestic cat but it had shorter legs. It hunted in the open woodland of Oligocene North America. Its coat may have been spotted or striped, but we do not know for sure.

IT'S A FACT

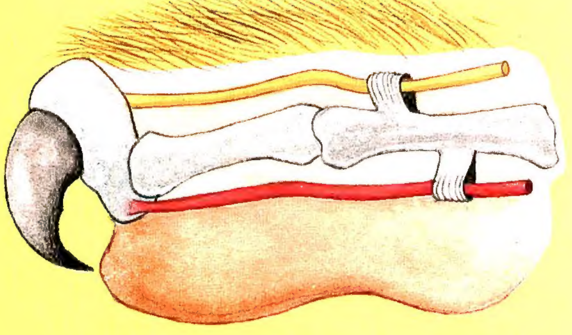
COPYCAT KILLERS

In the Age of Dinosaurs there were no biting or stabbing cats. But some of the meat-eating dinosaurs had claws that worked the same way as the large canine teeth of the stabbing cats. The sharp sickle claws of dinosaurs such as *Deinonychus* and *Velociraptor* would tear into soft tissue and leave their prey bleeding to death.

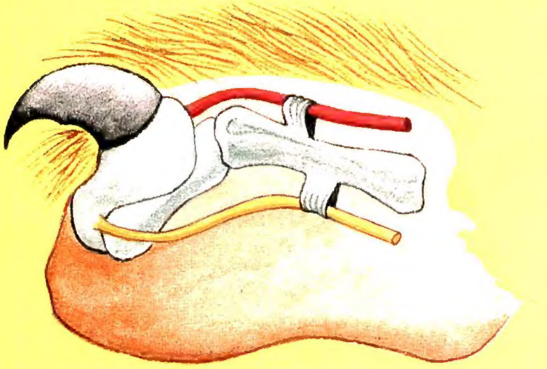


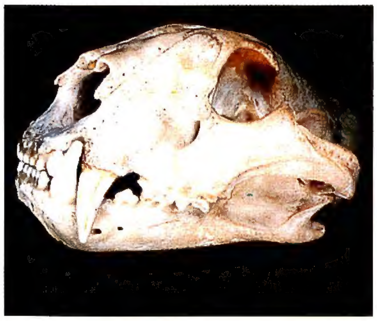
Sabre-toothed *Eusmilus* chase a *Palaesthérium* across the open plains 35 million years ago.

CATS' CLAWS

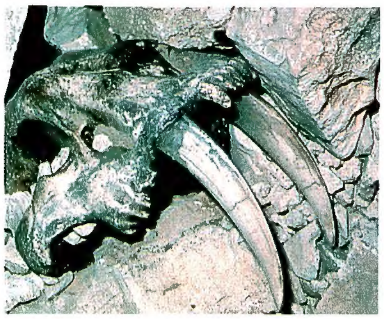


A cat retracts its claws by pulling up the last toe joints. With the claws pulled up it can walk silently on the pads of its feet.

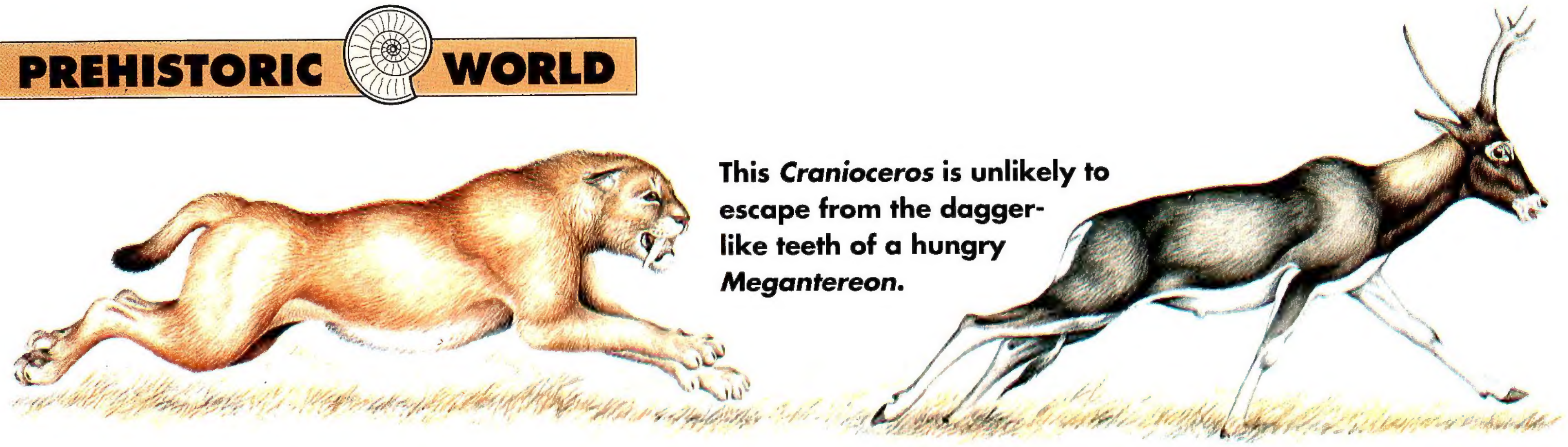




Biting cats had upper and lower canine teeth the same size.



Stabbing cats had much longer blade-like canine teeth.



This *Cranioceros* is unlikely to escape from the dagger-like teeth of a hungry *Megantereon*.

TWO WAYS OF KILLING

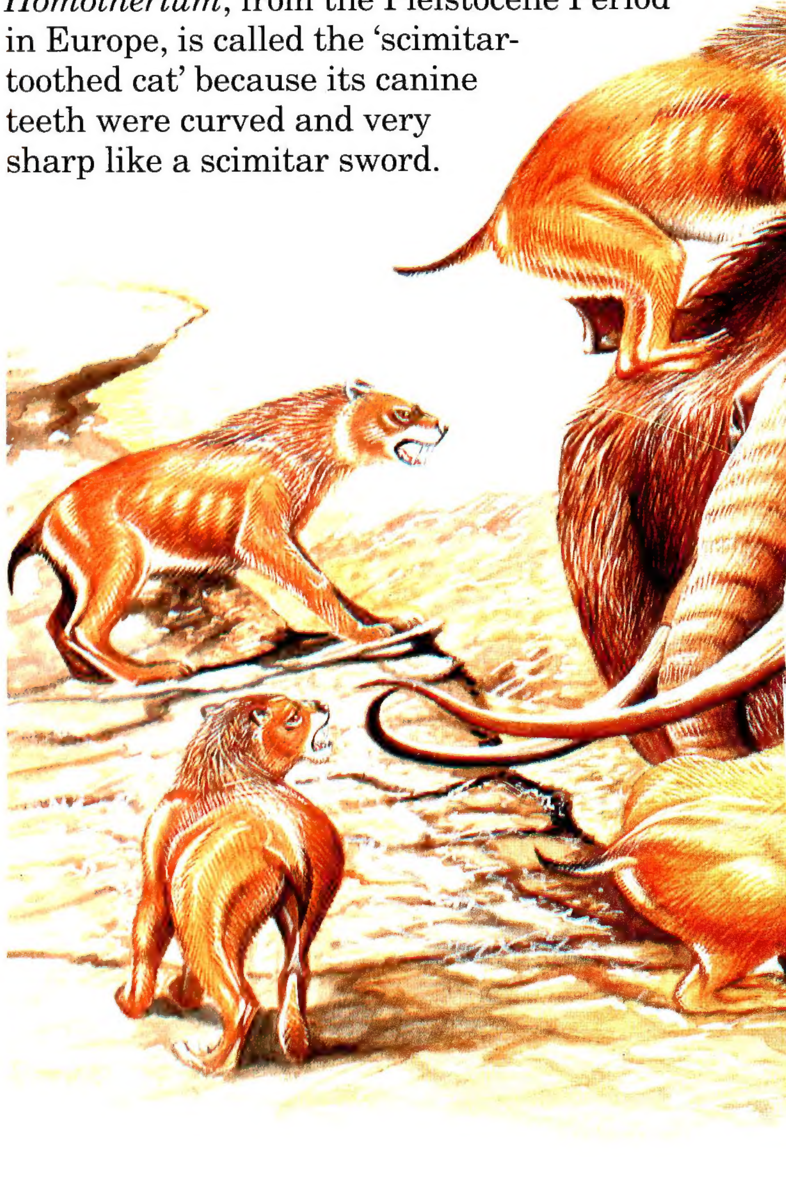
All modern cats kill their prey by biting it on the neck. In this way, they break the victim's backbone. Many ancient cats did this too, and we call these the 'biting cats'. Other cats killed by slashing at their prey with extra-large canine teeth. They then waited for the animal to bleed to death. These cats are called the 'stabbing cats'.

BIG TEETH

The stabbing cats all had big teeth. *Megantereon* lived in the Pliocene Period and ranged over most of the world. It was an early type of cat and had canine teeth that were much bigger than the teeth of a biting cat. We call this beast a 'dirk-toothed cat'. A dirk is a kind of dagger.

VERY BIG TEETH

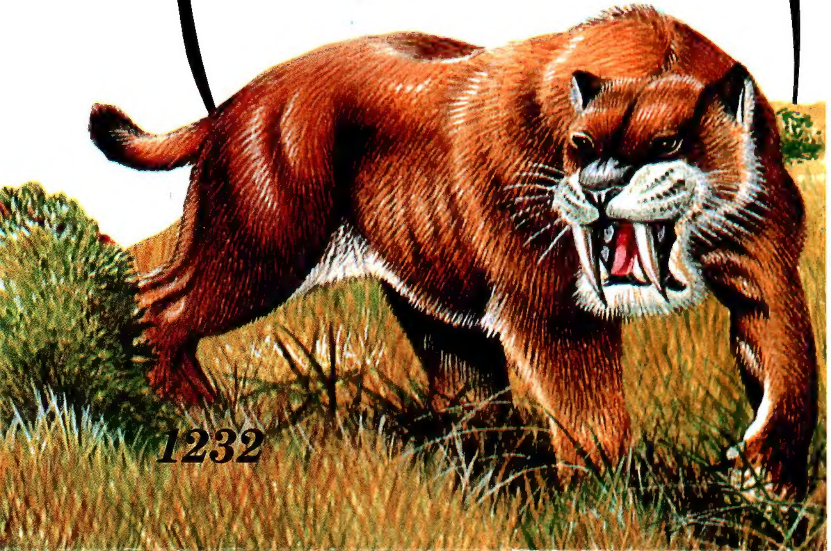
Homotherium, from the Pleistocene Period in Europe, is called the 'scimitar-toothed cat' because its canine teeth were curved and very sharp like a scimitar sword.



IT'S A FACT

I WANNA BE LIKE YOU HOO HOO

Look at this animal. It's a sabre-toothed cat, isn't it? Wrong! It is actually a marsupial, more closely related to the kangaroos than the cats. We call this beast *Thylacosmilus* (pouched chisel). It evolved in South America to hunt big thick-skinned animals and its stabbing teeth developed to enable it to kill in the same way as the sabre-tooth.



MAMMOTH LUNCH

Homotherium walked like a bear, and did not move very quickly. This was not a problem as it fed on slow-moving mammoths. We know this because skeletons of *Homotherium* families have been found alongside the ripped-apart bones of mammoths in Texas, USA.

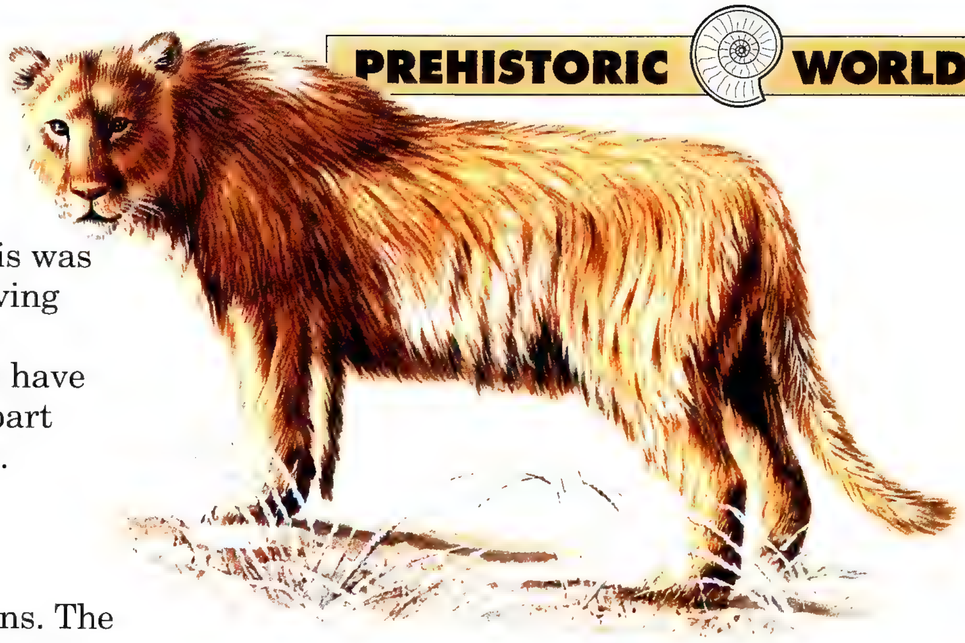
VERY, VERY BIG TEETH!

The true 'sabre-toothed cats' like *Smilodon* were as big as today's lions. The muscles of the neck and shoulders were built to provide power to the downward lunge that sheared the great sabre-teeth through the victim's flesh.

FALSE SABRES

Eusmilus was a so-called 'false sabre-toothed cat'. If it were not for its short legs, it would have looked just like one of the true sabre-toothed cats.

Scimitar-teethed Homotherium, attack a mammoth. With long front legs and shorter hind legs they probably looked like today's hyenas.



The cave lion (above) was much bigger than today's African lion (below). It would have looked even larger if covered with fur to protect it from the harsh conditions of the Ice Age.

A GOOD IDEA, WORTH REPEATING

Eusmilus fed on the same kinds of animals as a true sabre-tooth and that is why the same weapons, its enormous teeth and strong muscles, evolved. Scientists call this 'convergent evolution'.

THE BIGGEST OF THE BITING CATS

Although we have concentrated on big animals here, most of the ancient cats were quite small. However, the biggest known was the cave lion, *Panthera spelaea*. It was quite closely related to today's African lion *Panthera leo*. Some scientists think that it was actually the same species.

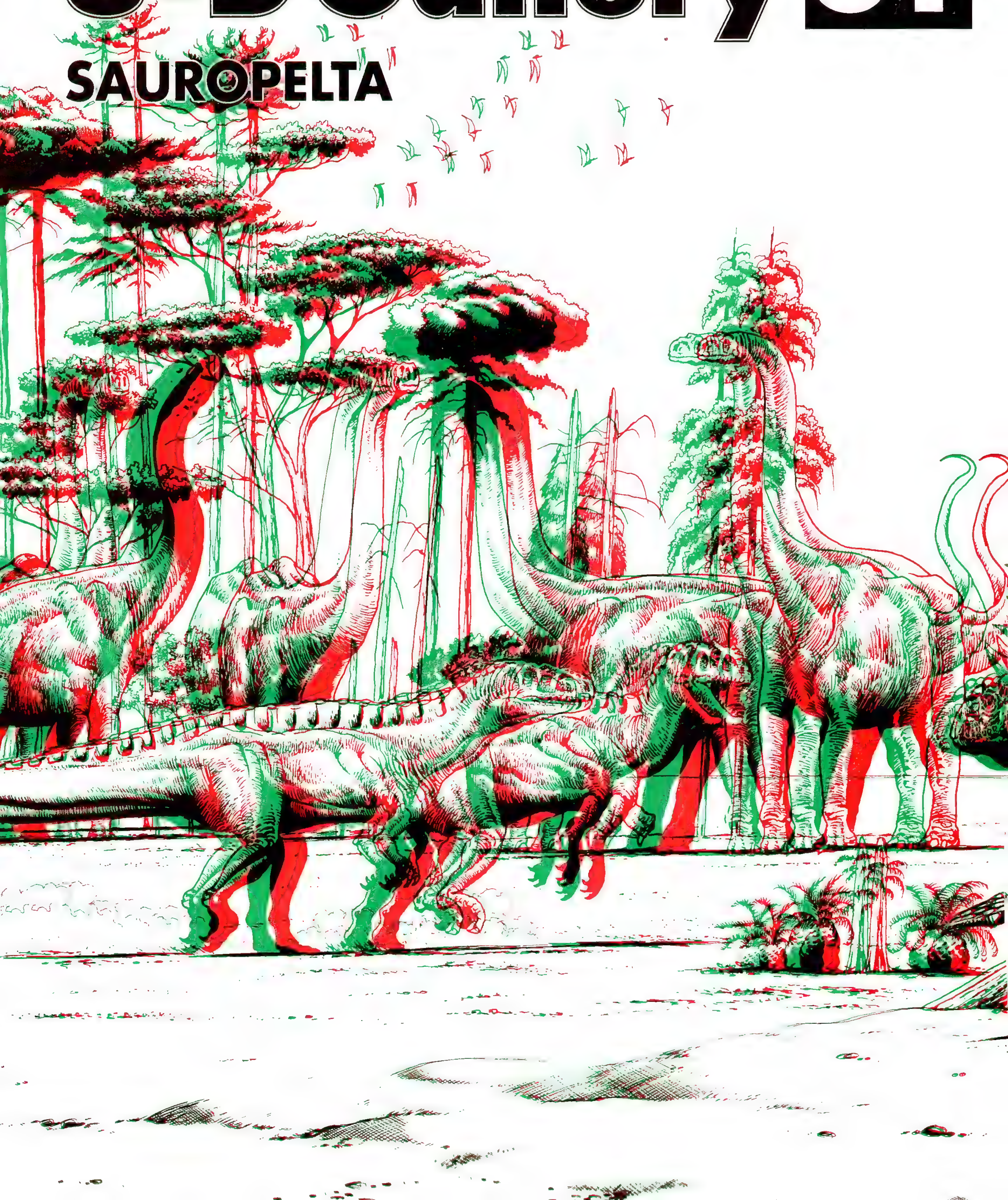
GIANTS OF THE PAST

From its carefully chosen hiding place – perched on the branch of a nearby tree – *Smilodon* has pounced on an unsuspecting giant ground sloth. The sabre-toothed cat does not fear the size of its giant prey and grips the sloth tightly with its razor-sharp claws. With its mouth gaping open, *Smilodon* prepares to plunge its fangs into the animal's neck. Once the deep incisions have been made, *Smilodon* will wait patiently for the ground sloth to die before feasting on its victim.

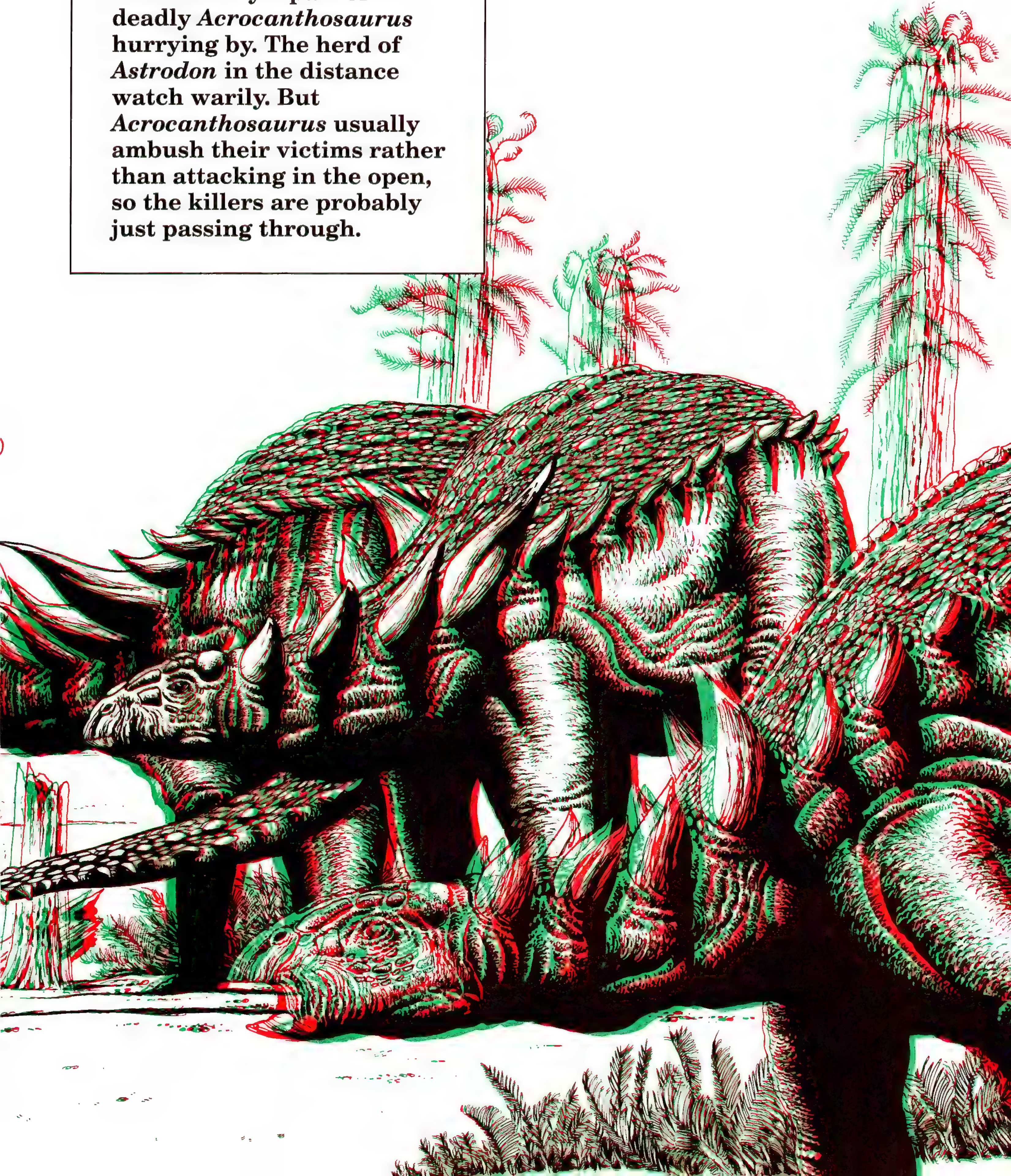
SMILODON

3-D Gallery 61

SAUROPELTA



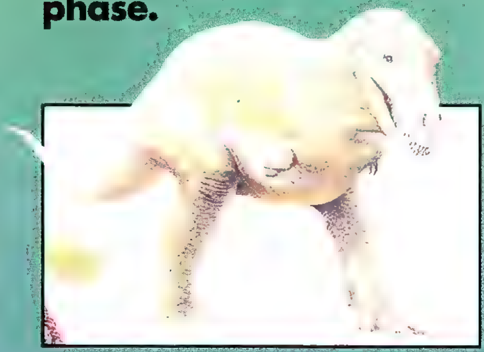
Grazing *Sauropelta* are disturbed by a pair of deadly *Acrocanthosaurus* hurrying by. The herd of *Astrodon* in the distance watch warily. But *Acrocanthosaurus* usually ambush their victims rather than attacking in the open, so the killers are probably just passing through.



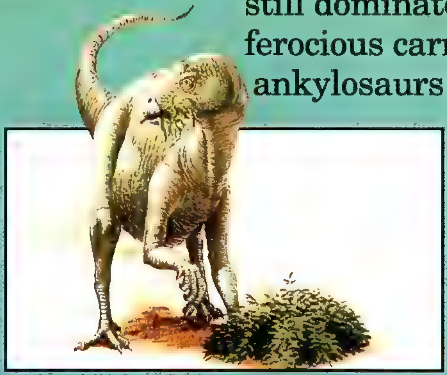
Cretaceous dinosaurs on parade

As plants flowered and continents drifted further apart, the Age of the Dinosaurs entered its final phase.

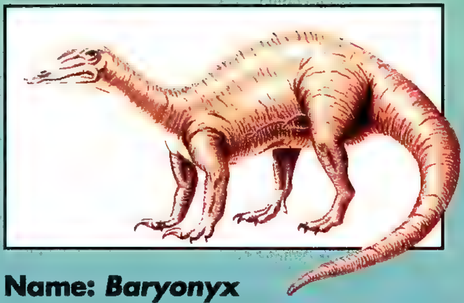
During the Cretaceous Period, small mammals began to evolve. But the Earth was still dominated by dinosaurs, including ferocious carnivores, heavily armoured ankylosaurs and spectacular herbivores.



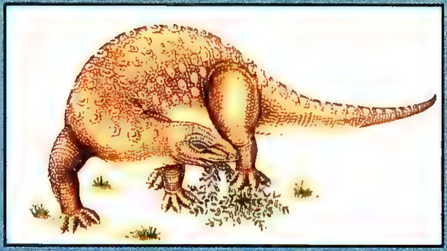
Name: ***Albertosaurus***
Family: Tyrannosaurid
Size: 9m long
Ate: Meat



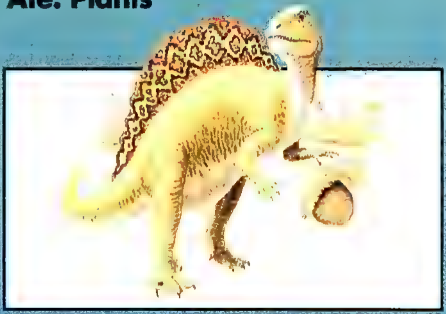
Name: ***Yaverlandia***
Family: Pachycephalosaurid
Size: 90cm long
Ate: Plants



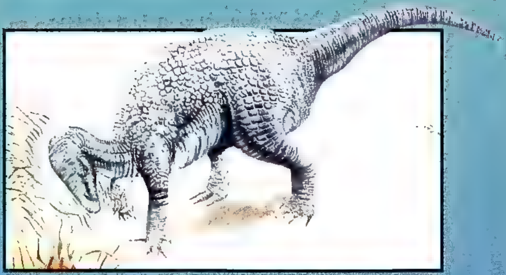
Name: ***Baryonyx***
Family: Baryonychid
Size: 9m long
Ate: Carrion and possibly fish



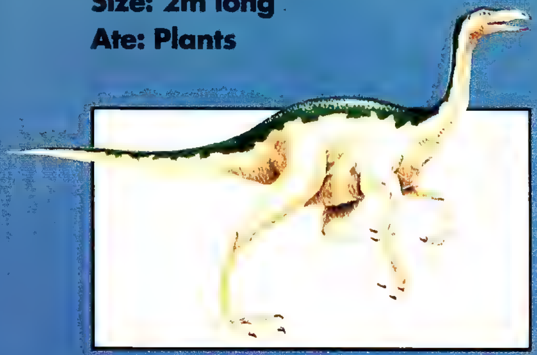
Name: ***Minmi***
Family: Nodosaurid
Size: 2m long
Ate: Plants



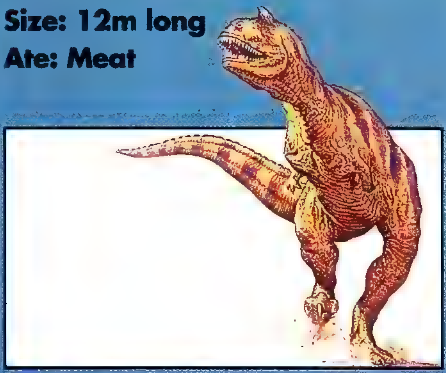
Name: ***Spinosaurus***
Family: Spinosaurid
Size: 12m long
Ate: Meat



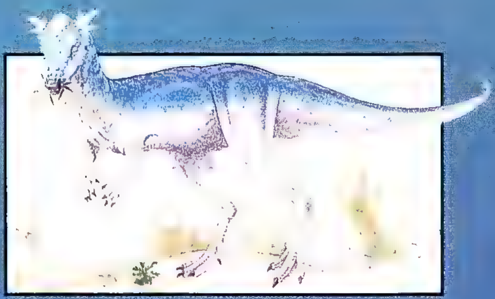
Name: ***Iguanodon***
Family: Iguanodontid
Size: 10m long
Ate: Plants



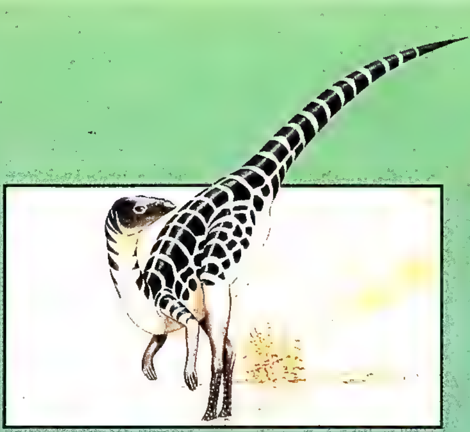
Name: ***Ornithomimus***
Family: Ornithomimid
Size: 3.5m long
Ate: Fruits, mammals, insects



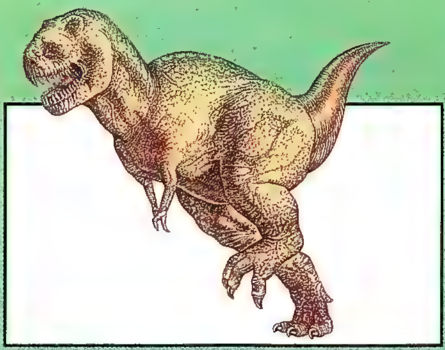
Name: ***Carnotaurus***
Family: Abelisaurid
Size: 7.5m long
Ate: Meat



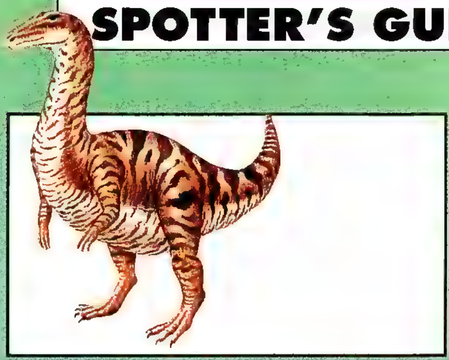
Name: ***Stygimoloch***
Family: Pachycephalosaurid
Size: 3m long
Ate: Plants



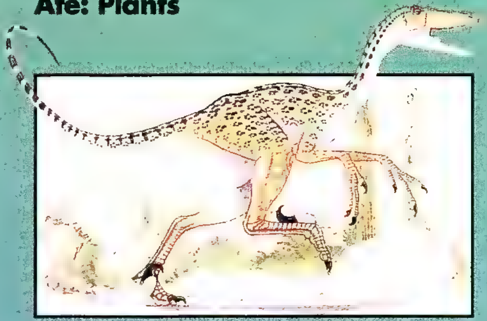
Name: *Leaellynasaura*
Family: Hypsilophodontid
Size: 60cm long
Ate: Plants



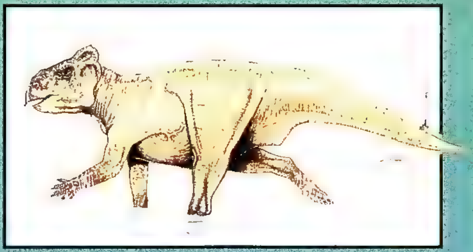
Name: *Tyrannosaurus rex*
Family: Tyrannosaurid
Size: 14m long
Ate: Meat



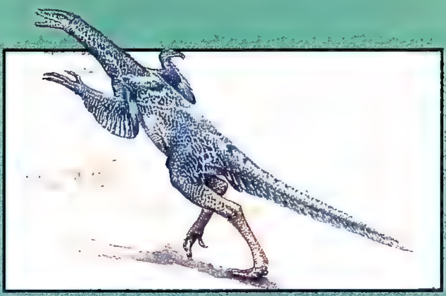
Name: *Segnosaurus*
Family: Segnosaurid
Size: 7m long
Ate: Plants, fish and meat



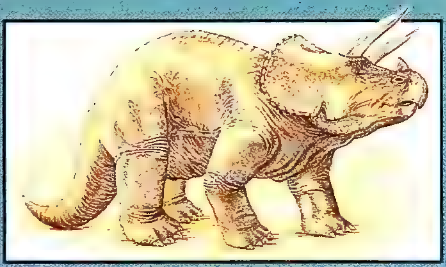
Name: *Velociraptor*
Family: Dromosaurid
Size: 1.8m long
Ate: Meat



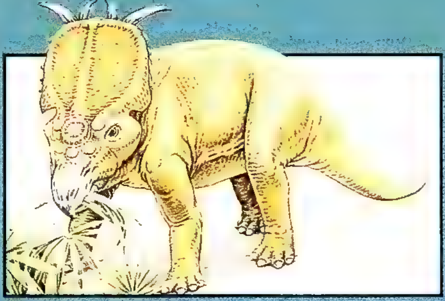
Name: *Leptoceratops*
Family: Protoceratopid
Size: 1.8m long
Ate: Plants



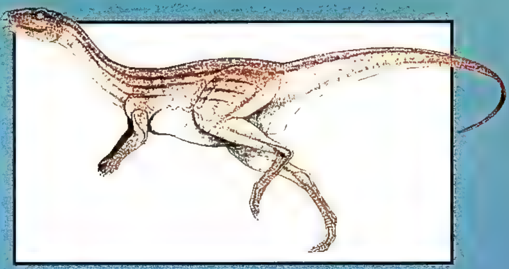
Name: *Avimimus*
Family: Avimimid
Size: 1.5m long
Ate: Insects and possibly flowers



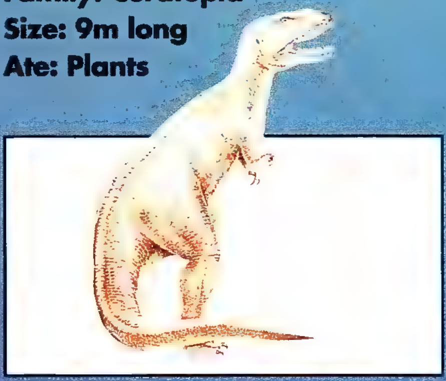
Name: *Triceratops*
Family: Ceratopid
Size: 9m long
Ate: Plants



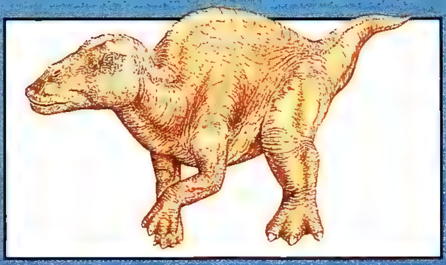
Name: *Pachyrhinosaurus*
Family: Ceratopid
Size: 5.5m long
Ate: Plants



Name: *Atlascopcosaurus*
Family: Hypsilophodontid
Size: 3m long
Ate: Plants



Name: *Daspletosaurus*
Family: Tyrannosaurid
Size: 8.5m long
Ate: Meat



Name: *Maiasaura*
Family: Hadrosaurid
Size: 9m long
Ate: Plants

KEY

TRIASSIC:
245 – 204 million years ago

JURASSIC:
204 – 140 million years ago

CRETACEOUS:
140 – 66 million years ago

More massive meat-eaters

With their huge jaws and mighty claws the giant meat-eaters were fearsome killers.

Theropods were dinosaurs that walked on two legs and ate meat. All the big theropods had large heads, short arms and pillar-like legs. To make theropods easier to study they have been divided into two groups: the ceratosaurs and the carnosaurs.

TERRIFYING TRIO

The three dinosaurs shown here are some of the best known theropods. *Ceratosaurus* and *Dilophosaurus* belong to the ceratosaurs and *Allosaurus* is a member of the carnosaurs. None of these was as gigantic as *Tyrannosaurus rex*, but they were still enormous. *Allosaurus* grew up to 12m. It was as long as a tennis court is wide. *Ceratosaurus* and *Dilophosaurus* were probably half the size of *Allosaurus*.

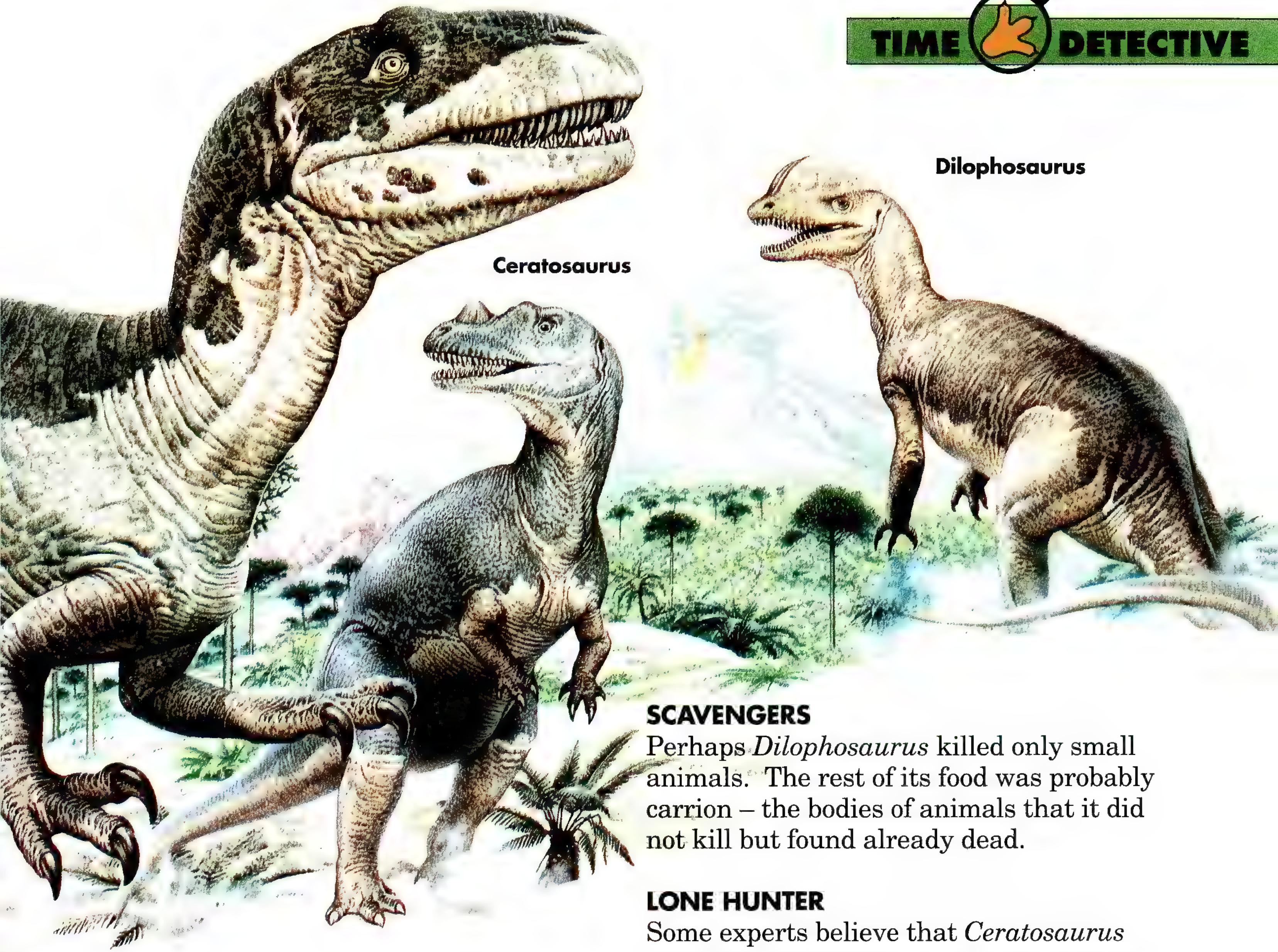
TIME SPAN

Dilophosaurus was the earliest of the three to menace the land. It appeared in Early Jurassic times, about 190 million years ago. *Allosaurus* and *Ceratosaurus* both arrived on the scene around 40 million years later.

Allosaurus

BIG THEROPOD CHECK LIST

- WALKED ON TWO LEGS
- ATE MEAT
- HUGE BODY



TO KILL...

The large theropods were some of the most terrifying meat-eaters ever. They were giant hunters that dominated the land in Jurassic and Cretaceous times. With their vast jaws lined with a battery of dagger-like teeth, these dinosaurs were also armed with lethal curved claws. They were truly fearsome killers.

...OR NOT TO KILL

Dilophosaurus may have been different from the rest of these large predatory dinosaurs. Some experts who have studied its fossil believe that its jaws were rather weak. It would not have had the jaw power to catch and kill large, live prey.

SCAVENGERS

Perhaps *Dilophosaurus* killed only small animals. The rest of its food was probably carrion – the bodies of animals that it did not kill but found already dead.

LONE HUNTER

Some experts believe that *Ceratosaurus* was a lone hunter because its fossils are so rare. But these dinosaurs must have been even more terrifying when they attacked together. Experts believe that the mighty *Allosaurus* hunted in packs.

Is it true that *Megalosaurus* was the first carnosaur to be named?

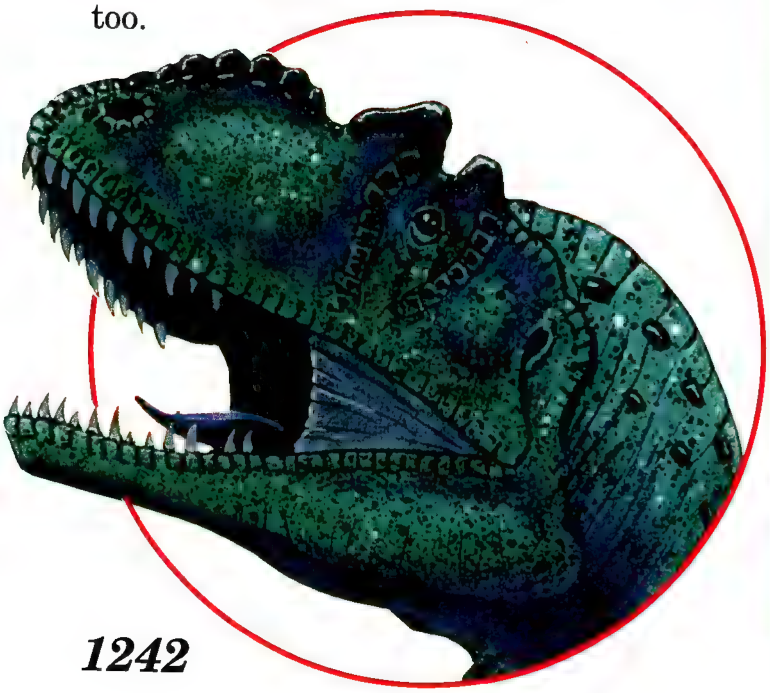
Yes. More than 20 different species of *Megalosaurus* have now been found. Most of these are known only from a tooth or claw. And scientists now believe there is not enough evidence to prove that they are all really types of *Megalosaurus*.

BIG HEAD

The skull of *Allosaurus* was huge. It was more than 60cm long and had powerful jaws. The teeth curved back and had saw-like edges, just like the blade of a steak knife.

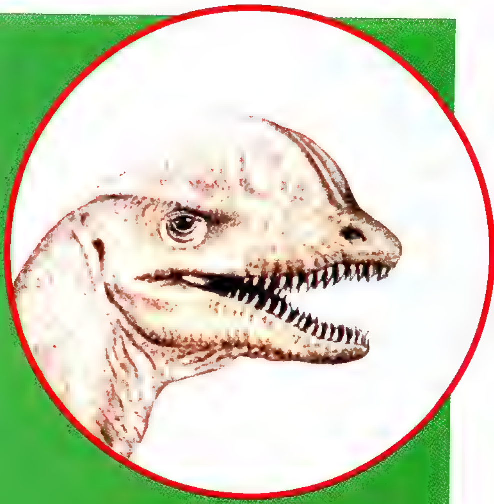
LOOKALIKE

In 1978 a new large meat-eating dinosaur called *Yangchuanosaurus* was found in China. It was half the size of *Allosaurus*. But the shape of its skull was very similar. Like *Allosaurus*, the skull was lightly built and it had vast jaws with many curved teeth. So *Yangchuanosaurus* may have been a carnosaur, too.



LUMPS AND BUMPS

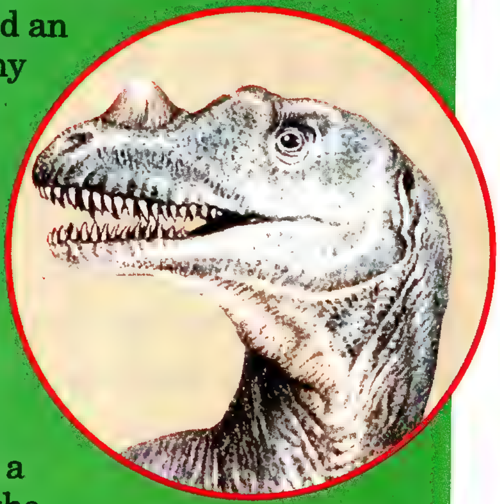
These dinosaurs had similar bodies but different heads. Each were decorated with odd-looking bumps, horns or crests.



DILOPHOSAURUS

BONY CREST

Dilophosaurus was the weirdest looking dinosaur of the three. It had an extraordinary bony crest on top of its head made up of two very thin ridges shaped like a pair of half dinner plates.



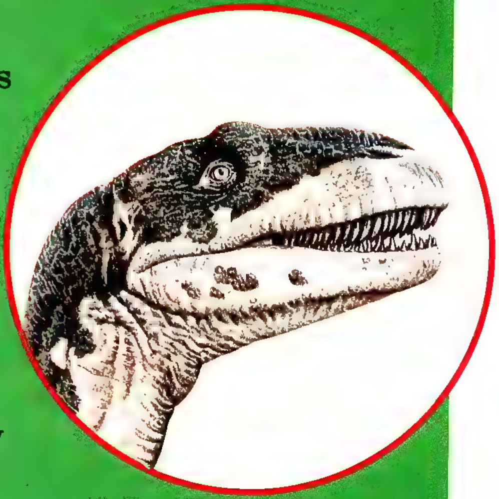
CERATOSAURUS

HUGE HORNS

Ceratosaurus had a large horn above the nose and two smaller horns above the eyes.

BONY BUMPS

Allosaurus' bumps might have contained salt glands to remove excess salt from its body. *Allosaurus* had two bony bumps above the eyes and a narrow bony ridge which ran down to the tip of the snout.



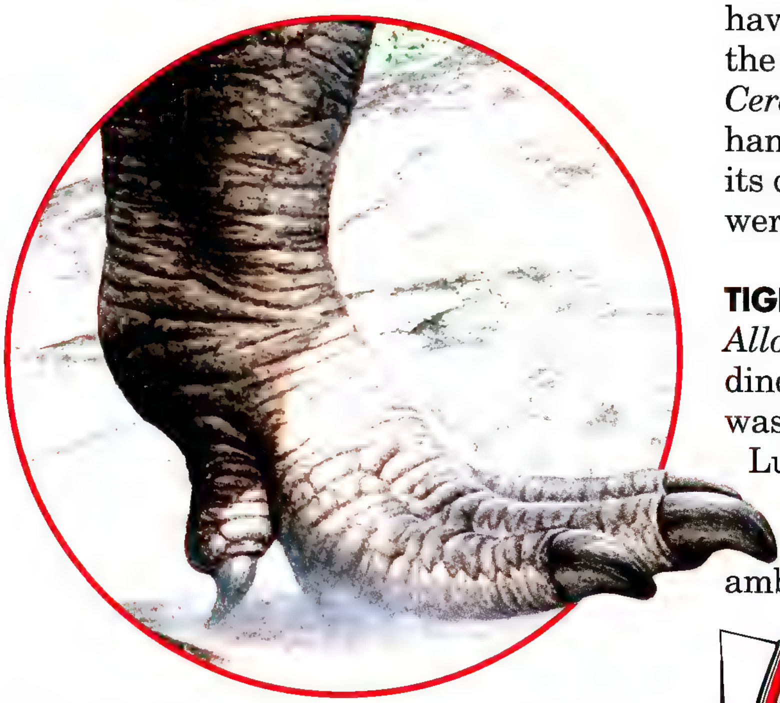
ALLOSAURUS

BIG THEROPOD CHECK LIST

- LARGE HEAD
- LONG TAIL
- POWERFUL LEGS

FRIEND OR FOE?

Scientists think the bony growths on these dinosaurs' heads were distinctive features that might have helped one dinosaur to recognise another. Or they could have been used for display, when a dinosaur was trying to attract a mate. No-one knows for sure the purpose of these crests.



FLAT OUT

These huge theropod dinosaurs had massive pillar-like legs to support their bulky bodies. The first toe of the foot pointed backwards which helped to spread the weight of the body. The dinosaur probably ran with its head lowered and its long tail held out behind to balance itself.

STRONG ARM

Unlike *T rex*, *Allosaurus* had powerful arms. It could have gripped its prey with the three sharp claws on its hands. *Ceratosaurus* had four fingers on each hand. *Dilophosaurus* may have relied on its claws to rip its prey apart. Its teeth were slender and it had a weak bite.

TIGER, TIGER

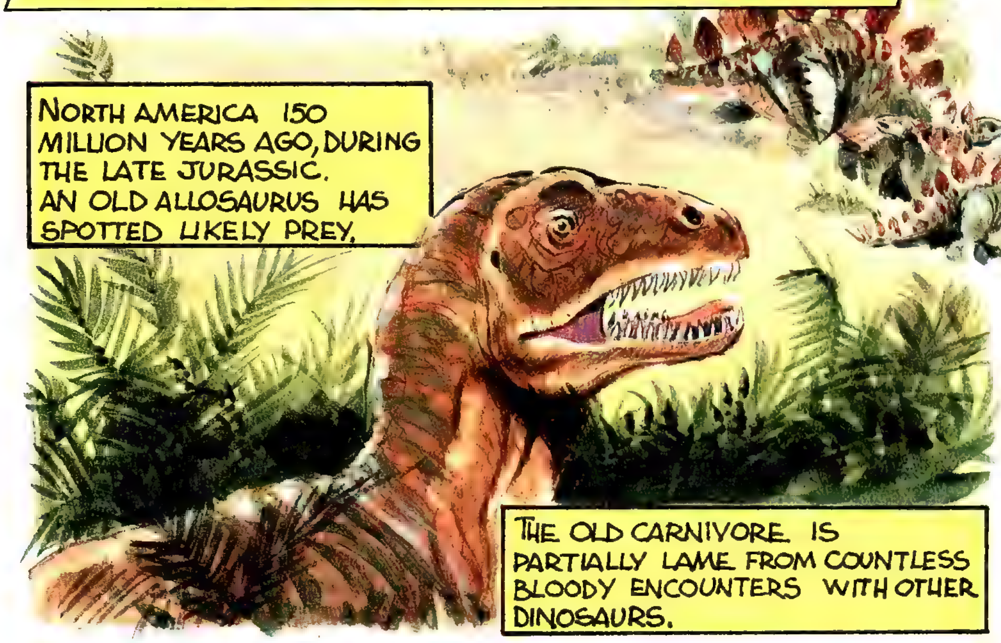
Allosaurus has been called the tiger of the dinosaur age. It was a skilful hunter but it was probably too large to move fast. Luckily, the giant plant-eating dinosaurs on which it fed were not much quicker. It probably killed by stalking or ambushing its prey. *Allosaurus* may also have hunted in a pack.

Is it true that *Allosaurus* was not always known by that name?

Yes. When the first fossil was discovered in 1869, scientists called it *Poicilopleuron*. Then it was renamed *Antrodemus*. This was later changed to *Allosaurus*.

A DAY IN THE LIFE OF ALLOSAURUS

NORTH AMERICA 150 MILLION YEARS AGO, DURING THE LATE JURASSIC. AN OLD ALLOSAURUS HAS SPOTTED LIKELY PREY.



THE OLD CARNIVORE IS PARTIALLY LAME FROM COUNTLESS BLOODY ENCOUNTERS WITH OTHER DINOSAURS.

UNABLE TO COMPETE WITH YOUNGER, FITTER ALLOSAURUS FOR ITS FAIR SHARE OF THE KILL, THE AGING MEAT-EATER HUNTS ALONE.

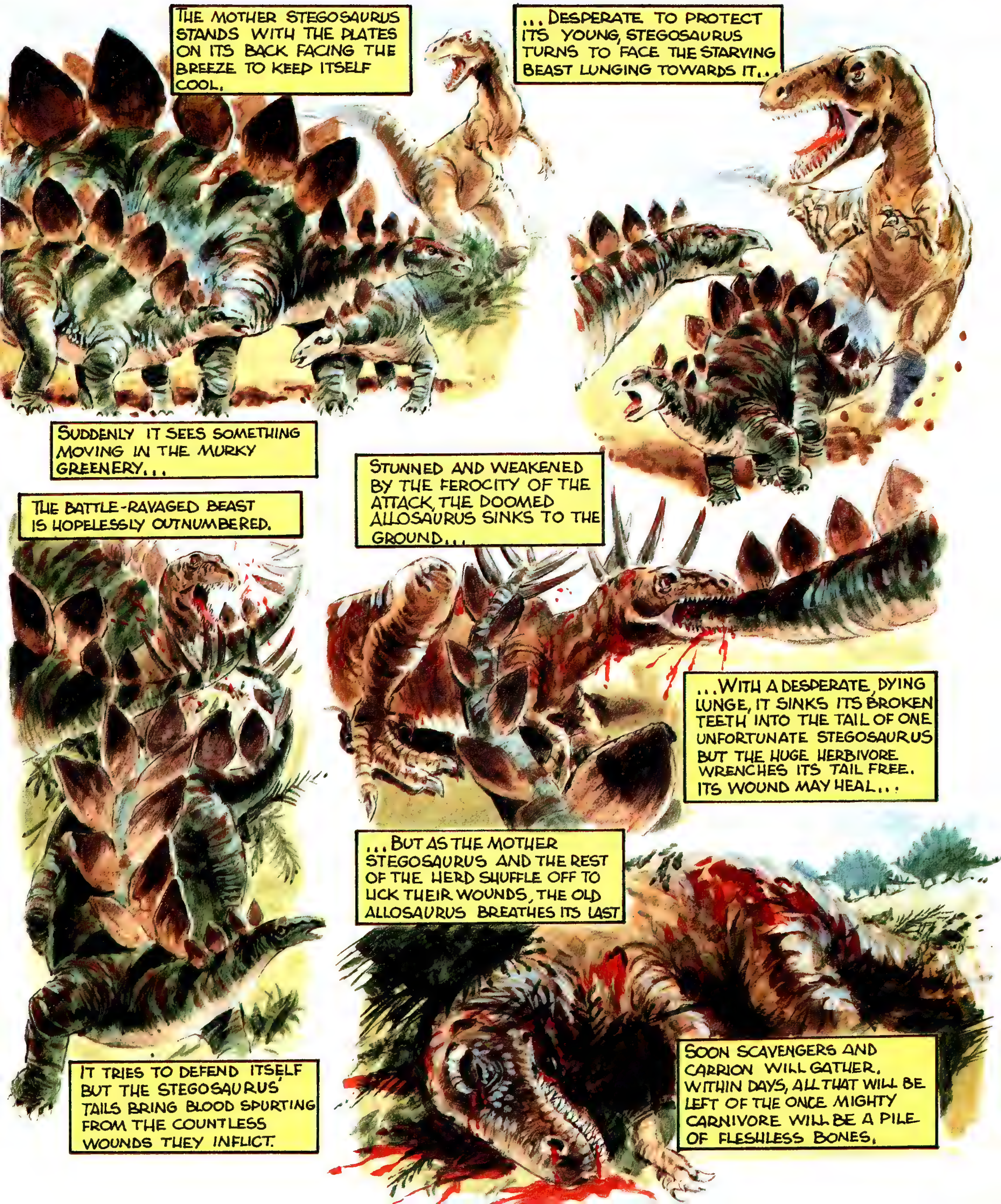
DESPERATELY HUNGRY, IT KNOWS THAT A YOUNG STEGOSAURUS WILL PROVIDE ENOUGH FOOD TO KEEP IT GOING FOR SOME TIME.

...THE JAWS OF THE OLD ALLOSAURUS CRUNCH INTO STEGOSAURUS' NECK, BUT THE BONY CRESTS SPLINTER SOME OF ITS TEETH. WRACKED WITH PAIN, IT BACKS OFF FOR A MOMENT.

SEIZING ITS CHANCE, STEGOSAURUS TRUNDLES ROUND ON ITS HIND LEGS AND SLAMS ITS SPIKED TAIL INTO THE SIDE OF ALLOSAURUS.

BUT THE OLD BEAST IS RAVENOUS FOR FOOD. DESPITE THE STORM OF EXCRUCIATING BLOWS, IT ATTACKS AGAIN AND AGAIN.

THE AGONISED GRUNTS OF THE OLD ALLOSAURUS AND THE FRANTIC SQUEALS OF THE PANICKED STEGOSAURUS ATTRACT OTHER MEMBERS OF THE STEGOSAURUS HERD, WHICH CRASH THROUGH THE FOLIAGE.


THE MOTHER STEGOSAURUS STANDS WITH THE PLATES ON ITS BACK FACING THE BREEZE TO KEEP ITSELF COOL.
SUDDENLY IT SEES SOMETHING MOVING IN THE MURKY GREENERY...
...DESPERATE TO PROTECT ITS YOUNG, STEGOSAURUS TURNS TO FACE THE STARVING BEAST LUNGING TOWARDS IT...
THE BATTLE-RAVAGED BEAST IS HOPELESSLY OUTNUMBERED.
IT TRIES TO DEFEND ITSELF BUT THE STEGOSAURUS' TAILS BRING BLOOD SPURTING FROM THE COUNTLESS WOUNDS THEY INFLICT.
STUNNED AND WEAKENED BY THE FEROCITY OF THE ATTACK, THE DOOMED ALLOSAURUS SINKS TO THE GROUND...
...WITH A DESPERATE, DYING LUNGE, IT SINKS ITS BROKEN TEETH INTO THE TAIL OF ONE UNFORTUNATE STEGOSAURUS BUT THE HUGE HERBIVORE WRENCHES ITS TAIL FREE. ITS WOUND MAY HEAL...
...BUT AS THE MOTHER STEGOSAURUS AND THE REST OF THE HERD SHUFFLE OFF TO LICK THEIR WOUNDS, THE OLD ALLOSAURUS BREATHES ITS LAST
SOON SCAVENGERS AND CARRION WILL GATHER. WITHIN DAYS, ALL THAT WILL BE LEFT OF THE ONCE MIGHTY CARNIVORE WILL BE A PILE OF FLESHLESS BONES.

Improve and test your knowledge with...

FACT FILE

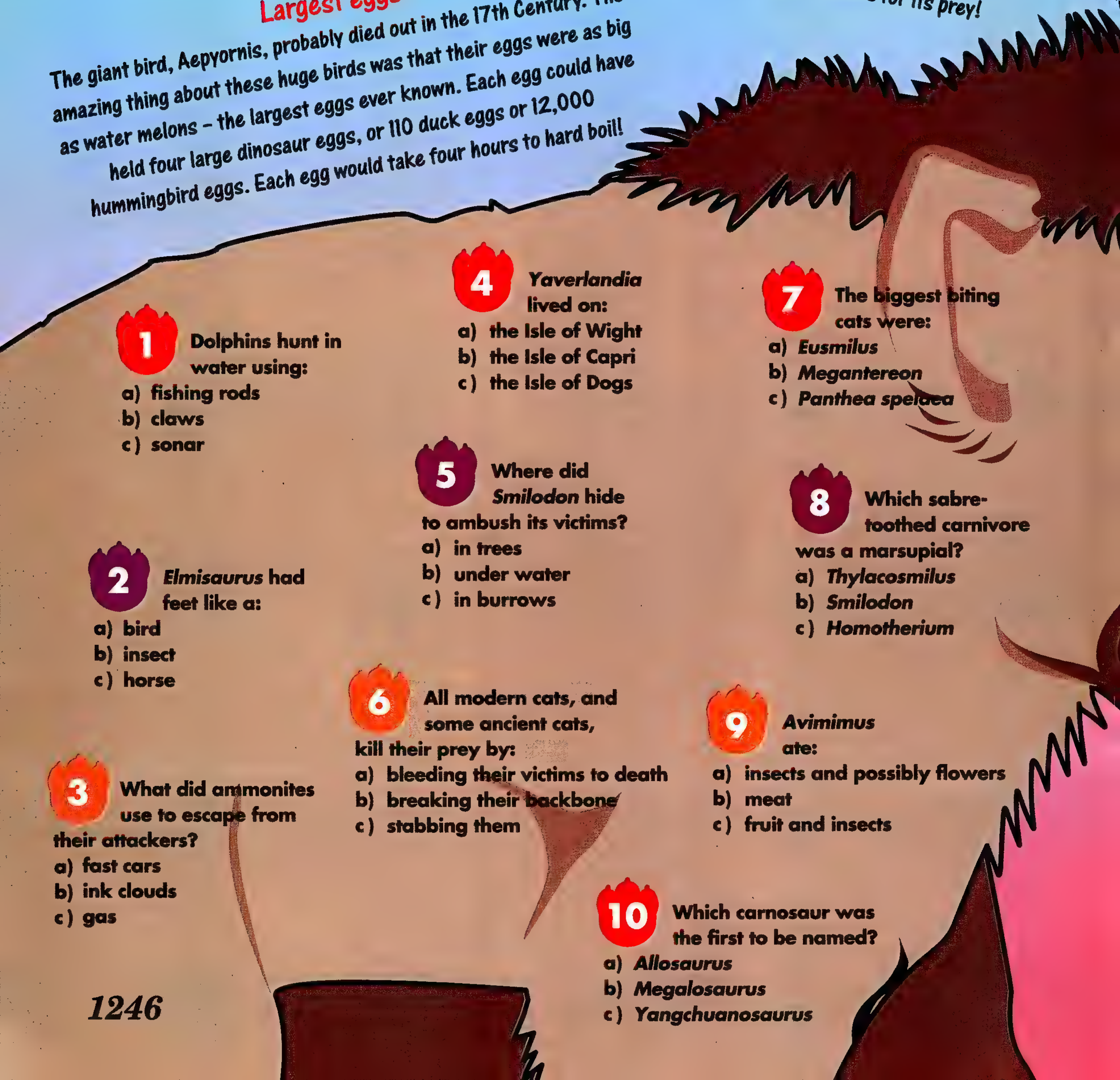
Follow the footprints to complete the quiz and get to the bottom of the question!

Largest eggs

The giant bird, Aepyornis, probably died out in the 17th Century. The amazing thing about these huge birds was that their eggs were as big as water melons – the largest eggs ever known. Each egg could have held four large dinosaur eggs, or 110 duck eggs or 12,000 hummingbird eggs. Each egg would take four hours to hard boil!

Rejuvenating teeth!

Thylacosmilus was the only sabre-toothed whose two long sabre teeth grew continuously to make up for wear at the tips. As it probably fed on thick-skinned herbivores this was good news for Thylacosmilus but bad news for its prey!



1 Dolphins hunt in water using:

a) fishing rods
b) claws
c) sonar

2 *Elmisaurus* had feet like a:

a) bird
b) insect
c) horse

3 What did ammonites use to escape from their attackers?

a) fast cars
b) ink clouds
c) gas

4 *Yaverlandia* lived on:

a) the Isle of Wight
b) the Isle of Capri
c) the Isle of Dogs

5 Where did *Smilodon* hide to ambush its victims?

a) in trees
b) under water
c) in burrows

6 All modern cats, and some ancient cats, kill their prey by:

a) bleeding their victims to death
b) breaking their backbone
c) stabbing them

7 The biggest biting cats were:

a) *Eusmilus*
b) *Megantereon*
c) *Panthea spelaea*

8 Which sabre-toothed carnivore was a marsupial?

a) *Thylacosmilus*
b) *Smilodon*
c) *Homotherium*

9 *Avimimus* ate:

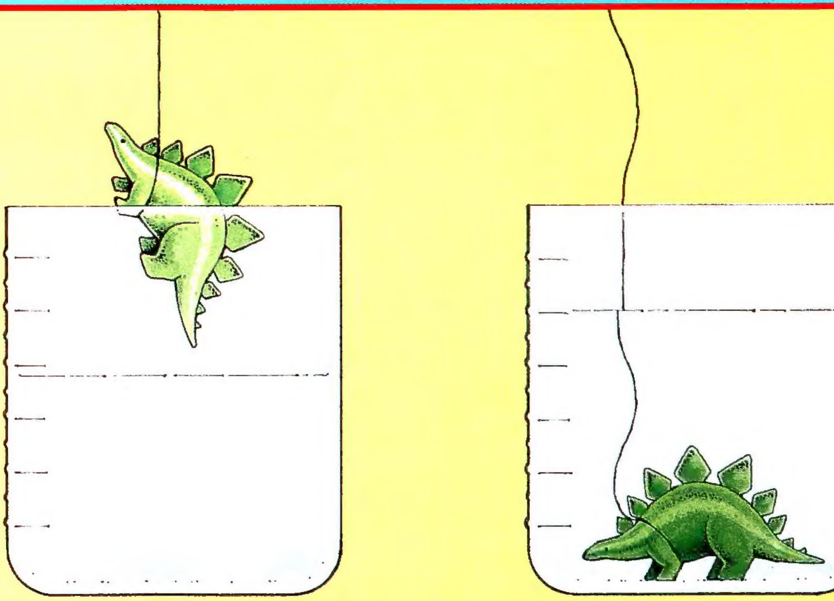
a) insects and possibly flowers
b) meat
c) fruit and insects

10 Which carnosaur was the first to be named?

a) *Allosaurus*
b) *Megalosaurus*
c) *Yangchuanosaurus*

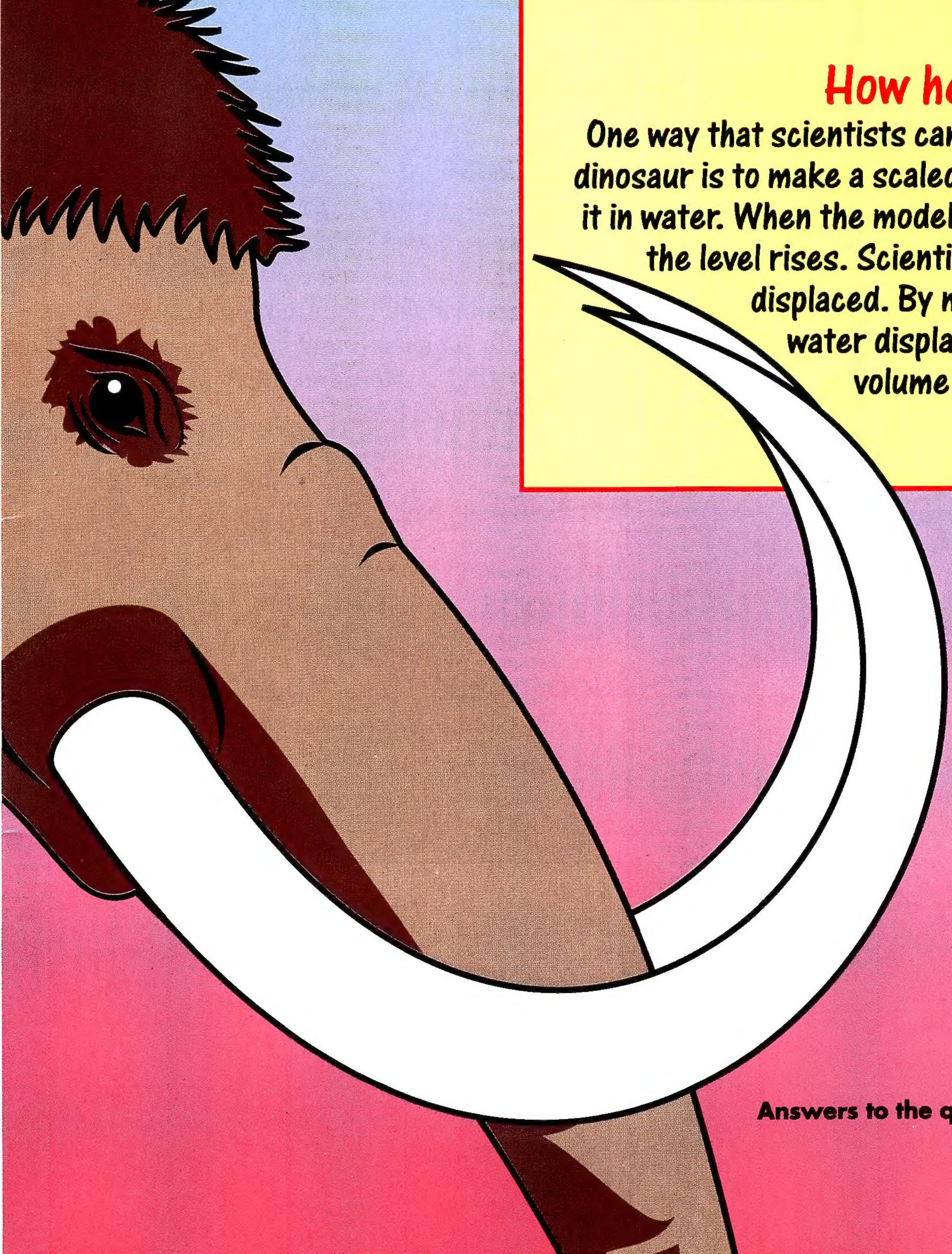
A Monstergator!

Deinosuchus was a 12m-long Cretaceous crocodile. It could have fought with Tyrannosaurus rex and won!



How heavy?

One way that scientists can estimate the weight of a dinosaur is to make a scaled down model and immerse it in water. When the model is lowered into the water, the level rises. Scientists say that the water is displaced. By measuring the amount of water displaced, they can calculate the volume and the likely weight of a living dinosaur.



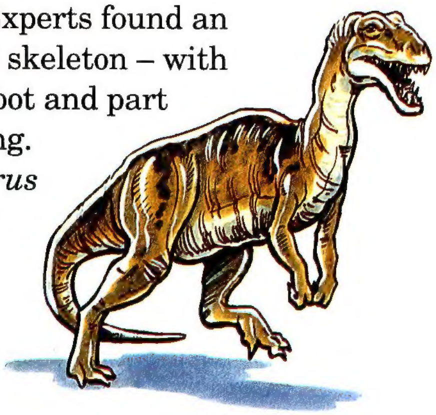
Holy construction!

The Bernissart skeletons were the numerous skeletons of Iguanodon found in a mass grave in Bernissart, Belgium. Of all places, its seems they were originally constructed in the chapel of St George in Brussels, Belgium, before being transferred to Brussels Museum. Disused at the time, the chapel was the only building large enough!

Answers to the questions on inside back cover

YANGCHUANOSAURUS 150 MYA

The fierce, flesh-eating *Yangchuanosaurus* (yang-chwan-oh-saw-rus) strode about on two powerful legs. As long as an elephant with a huge head and massive jaws, *Yangchuanosaurus* was named after Yanchuan Country in Sichuan, China where it lived. Experts found an almost complete skeleton – with only an arm, a foot and part of the tail missing. *Yangchuanosaurus* may have had a low fin running along the middle of its back.



YAVERLANDIA 115 MYA

Only a small fragment of the skull roof of *Yaverlandia* (yav-er-land-ia) was discovered. But from this, scientists decided that it was probably a pachycephalosaur, with a low-domed head and thick, flat skull. Little *Yaverlandia* lived in the Early Cretaceous Period – on the Isle of Wight, southern England – and was named after Yaverland Point, where it was found. It was not much longer than a full-sized tennis racket and walked on two legs. *Yaverlandia* browsed on low-growing vegetation.

YUNNANOSAURUS 180 MYA

Yunnanosaurus (yoo-nan-oh-saw-rus) lived in the Early Jurassic Period. It was as big as a large dog and had a small head, long neck, and a bulky body. It is the only prosauropod known to have had self-sharpening teeth.

Z

ZEPHYROSAURUS 130 MYA

Zephyrosaurus (zef-eye-roe-saw-rus) was an agile plant-eater. It moved quickly on two legs and was about the size of a modern wolf. *Zephyrosaurus* had ridged teeth to help it chew tough plants. The skull and some of the backbone were found in Montana, USA. Its name means 'west-wind reptile'.

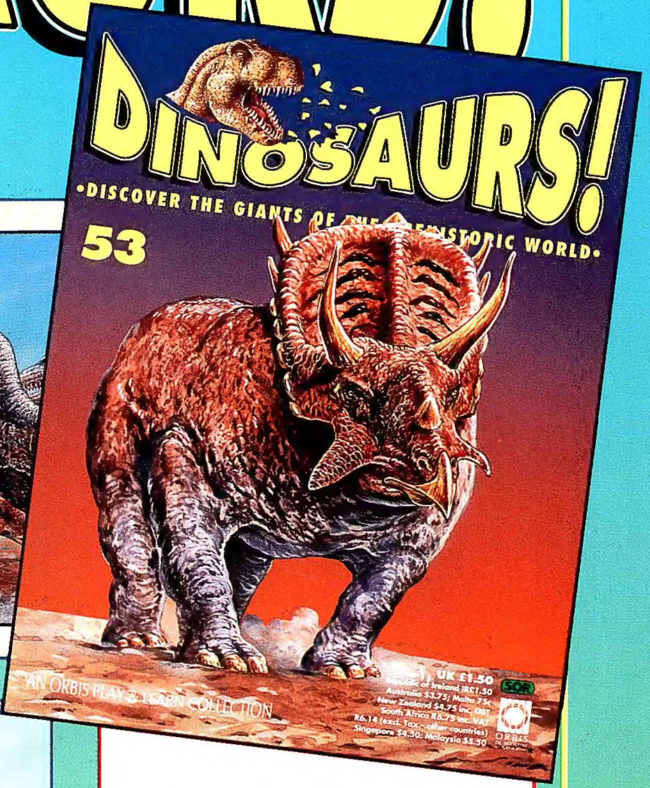
ZIZHONGOSAURUS 180 MYA

Longer than a coach, *Zizhongosaurus* (zis-hon-go-saw-rus) was a primitive sauropod. It lived in Zizhong County in China, in the Early Jurassic Period. Its large body was supported by four strong legs. It had a tiny head at the top of a long neck. Plant-eating *Zizhongosaurus* looked like a smaller version of the Indian sauropod, *Barapasaurus*.

MYA = MILLION YEARS AGO

COMING IN PART 53 OF

DINOSAURS!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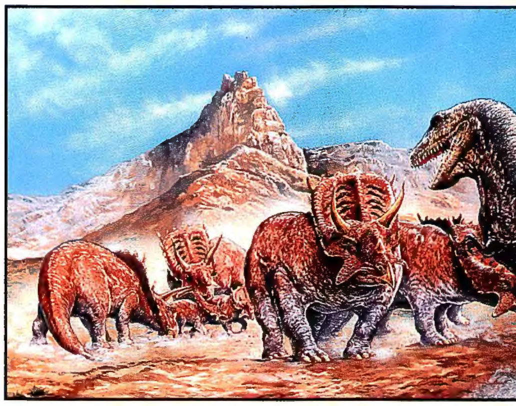
Learn how to 'read' a piece of rock in TIME DETECTIVE. Which mammals were the first meat-eaters? Find out in PREHISTORIC WORLD.



PLUS

Three fascinating prehistoric creatures in
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and
GIANTS OF THE PAST
3-D GALLERY
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ANSWERS TO FACT FILE QUESTIONS: 1.c 2.a 3.b 4.a 5.a 6.b 7.c 8.a 9.a 10.b

Dr. David Norman of Cambridge University answers your dinosaur questions

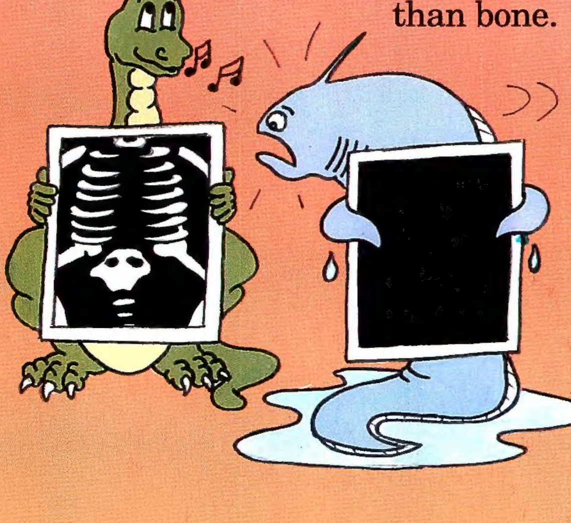
ASK THE EXPERT

Were there other great extinctions apart from the dinosaur one?

Yes, and some scientists believe these extinctions occur about every 30 million years. None are so well known as the dinosaur extinction, but some were even more dramatic. A huge number of sea creatures – early fish, ammonoids and brachiopods – died out at the close of the Devonian Period. Equally, at the end of the Permian, close to 80 per cent of all marine reptiles became extinct.

Did prehistoric sharks have bones like other fish?

No. Like sharks today, prehistoric sharks did not have bones like some other fish. Sharks are members of a group of fish known as chondrichthyans – a name which literally means 'cartilaginous fishes'. The members of this group all have a skeleton made of cartilage. This is a milky-coloured, rubbery material which is softer and more pliable than bone.

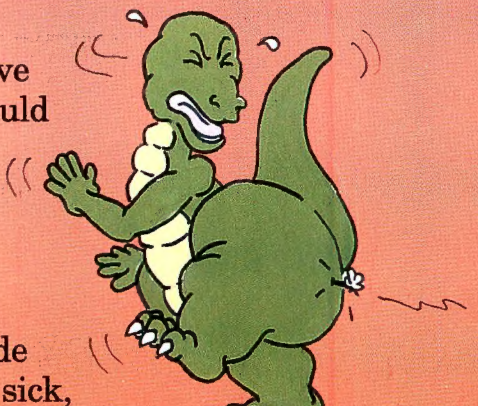


Why did most prehistoric marine mammals lose their ears?

Most marine mammals lost their external ears largely because they needed to be more streamlined to suit their life underwater. But this did not mean they had poor hearing. In fact, many marine mammals develop incredibly acute hearing. Dolphins and the toothed whales generally use sonar, which is a very effective method of hunting in water. Trained dolphins can be blindfolded and are still able to distinguish between different shaped objects using sonar.

Did insects bite dinosaurs?

Yes. The most likely insects to bite dinosaurs would have been ticks. These could have burrowed into the skin folds around the dinosaurs' necks, shoulders and hips. Ticks may have made the dinosaurs quite sick, because some of them carry diseases. So this is one animal that really did get under a dinosaur's skin!



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